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MENTAL DEVELOPMENT AND EDUCATION

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MENTAL DEVELOPMENT AND EDUCATION

BY

M. V. O'SHEA

PROFESSOR OF EDUCATION

THE UNIVERSITY OF

WISCONSIN

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PREFACE

In writing this volume the author has had constantly in mind the interests and needs of teachers in service and also persons who are preparing to teach. Consequently those aspects only of mental development and of education which directly concern those who train the young have received attention; all strictly technical and speculative discussion has been avoided. No attempt has been made to treat comprehensively the psychology of childhood and youth or educational values and methods. Two questions have guided the discussion throughout; — first, How does the individual normally respond at different periods in his development to the typical situations, physical, intellectual, æsthetic and social, in which he is placed; and second, How can he best appropriate the materials and benefits of education so that he can utilize them to greatest advantage in daily life?

The point of view is that afforded by present-day biological psychology. For those who may not at first glance see just what this point of view is, it may be said that one who regards human nature from the standpoint of biological psychology seeks to explain the behavior of a child or a youth on the basis of natural laws governing the development of his body, his intellect and his character. It is seen that the individual is at birth equipped with tendencies which represent some of the activities which have proved of service in the life of his ancestors, and these tendencies are manifested in varying degrees and forms in the course of development from birth to maturity. But the child is born into an environment which is fundamentally different in many respects from that in which the impulses which he brings with him were

established, and so he encounters difficulties in adjusting himself to the world in which he must live. It is the object of education in the school and in the home to assist the individual to make necessary modifications of and adjustments to his environments as easily and effectively and with as little strain and stress as possible. To secure information bearing on these matters, the writer has made observations and investigations on his own part and has studied the investigations made and views presented by others; and he has endeavored to organize and interpret all available data, and present conclusions in straightforward, intelligible language.

Stress is laid in this volume on dynamic methods in teaching, and an attempt is made to observe the principles advocated by assigning an important place to exercises requiring the student to analyze and investigate problems, to interpret data bearing on various aspects of development and education, and to apply conclusions to original situations. It is the author's experience that most readers and students need the stimulus of concrete problems in order actually to master what they read or study, and especially to gain ability and facility in making practical use of the principles they acquire. So in Part III of this volume many photographs, diagrams, tables, graphs, quotations and queries are employed, all relating in an orderly way to subjects which are discussed in the text, and the reader is encouraged to utilize all his resources in knowledge and critical method to throw light into dark places and to bring apparently divergent phenomena under a few basic principles of development and of education. A sufficient variety of exercises has been provided so that a class, a study circle, or an individual reader can select according to special interests, facilities for investigation, or degree of acquaintanceship with psychology and related sciences.

In 1905 the writer published a volume entitled "Dynamic Factors in Education," which was more or less of a pioneer in the

field which it covered. This book met with a generous welcome from teachers, and it has apparently played a small part at least in promoting dynamic methods of teaching in the schools of our country; but the plates have become worn, and it has been decided not to reprint it. Consequently, it has seemed advisable to include in this volume a few of the more useful chapters, thoroughly revised, of the earlier book. It is possible that a reader of this volume may recognize some paragraphs which he saw in the earlier book, but the little that has been preserved from "Dynamic Factors in Education" has been brought into accord with the large amount of research that has been conducted in this field since the earlier book was written.

M. V. O'Shea

The University of Wisconsin
Madison, Wisconsin

CONTENTS

PART I

DYNAMIC ASPECTS OF MENTAL DEVELOPMENT

CHAPTER PAGE

I. Motive Forces in Development: Physical Well-being 3

A simple illustration of the nature and rôle of driving forces. Physical welfare. Predominance of the food-securing impulse. Self-protective impulses. Conflict of motive forces. Resistance to remedial treatment. The impulse to seek protection from wind and weather. Interest in clothing for decoration rather than for protection. Fear as a protective agent. Fear as a motive force in development.

II. Motive Forces in Development: Social, Intellectual and Æsthetic Well-being 18

The passion for experiences with persons. The passion to communicate. The strongest force of all,—the wish to secure the good-will of one's fellows. Rivalry as a motive force. Resentment and aggression. Submission to leadership as a motive force. The urge to gain knowledge for its own sake. The constructive impulse as a motive force. The impulse to solve intellectual problems. The choice of the beautiful and avoidance of the ugly. Activities reminiscent of ancestral life. Environment vying with hereditary forces. Two forces acting on the child in his development.

III. Primitive Forms of Adaptive Activities: Trial and Success; Imitation 35

The helplessness of the infant. The first step in acquiring adaptive activities. A concrete example of acquiring a

CHAPTER PAGE

voluntary act. Learning involves excessive activity. The integration of simple acts into more complex adjustments. Nothing is learned *de novo*. Imitation as a form of adaptive activity. The phenomena of mimicry. When does imitation begin? Apperception in imitation. The principle illustrated in adult imitation. The course of development with respect to imitativeness.

IV. Higher Forms of Adaptive Activity: Generalization; Symbolization; Imagination; Reason . . . 54

The adaptive activities of animals. "King Pharaoh's" abilities. Types of intelligence. Sensori-motor response. A horse's responses depend upon visual, auditory or olfactory cues. The quality of animal intelligence. Popular misconceptions regarding the abilities of animals. Illustrations of a dog's intelligence. One trait of distinctly human intelligence, — symbolization. Importance of symbolization in adaptive activity. Development of symbolizing activities in the child. The ability of the individual to develop free ideas. The ability to foresee consequences and adapt means to ends. Free concepts must be controlled by the ends to be attained. The most important distinction between the primitive and the higher types of intelligence. Analysis and synthesis.

V. Expressional Activities: Vocal, Featural, Postural, Gestural 77

Indefiniteness of the first efforts at expression. Ready-made means of expression. Darwin's view of the origin of expression. The expression of complex emotions. Organic accompaniments of emotion reënforce motor reactions. The James-Lange Theory. With the child expression is intense but of short duration. With the adult, expression is subdued, but it is more enduring than in the earlier years. Why does expression become subdued with development? Women are more expressive than men. Racial differences in expression. The expression of thought. Reflection involves strain and effort. Purpose-

CHAPTER PAGE

ful expressional activities. Gesture. Figurative gesture. The use of the gesture in conveying ideas of quality and of action. The use of gesture to emphasize feeling. Relation of gesture to language. Individual differences in the use of gesture.

VI. Expressional Activities: Graphic, Pictorial . . . 106

The development of a sign language. The development of linguistic symbols. Scribbling activities. Studies of children's drawings. Difficulty of representation no barrier to expression. Older children are inhibited. The child's diagrams embody the most essential characteristics of objects. Always the same diagram for any given object. Special characteristics of objects not included in diagrams. Are logical relations revealed in children's drawings? Difficulty in representing special relations. Language acquired more easily and naturally than drawing. The psychology of drawing.

VII. The Development of Coördination 128

Coördination in infancy. The first stages in acquiring manual dexterity. The wave of development is toward the extremities. The development of pedal control. The development of coördination in speech. The principle illustrated in the child's use of sentences. The order of losing coördinations in degeneration.

VIII. The Development of Inhibition; the Neurological and Psychological View 140

Children's lack of inhibition. The effect of motor restraint on mental activity. Restraint comes with development. The neurological view of inhibition. Suggestions gained from the phenomena of degeneration.

IX. The Development of Inhibition; Restraining Forces . 154

The perfectly restrained individual. Experiences which develop restraint. Stages in acquiring restraint. Physical coercion not the only force that leads to re-

CHAPTER PAGE

straint. Restraining influences operate differently at various stages in development. Imitation of self-restraint in others. The restraining influence of heroes in stories. The fusion of restraining forces. The weakening of an impulse. The rôle of formal education in developing restraint. The influence of ideals established in history, literature, *et al.* The restraining influence of habits established by study. Individual differences in the matter of self-restraint.

X. Activities Peculiar to Adolescence 169

Transformations occur abruptly during puberty. Boys form gangs. The boy is interested in tribal activities. The boy's tribal interests will flourish only in the gang. The larger the gang the more tribal its interests. The gang promotes pugnacity. Muscular contests. Stealing. The instinct of acquisition. Destruction of property. Profanity and the use of tobacco go hand in hand with stealing, etc. Truancy. Swimming. Competition in games. Girls form "sets" which are only loosely organized. Activities growing out of sex-interest. Eagerness to find a job.

PART II

EDUCATIONAL INTERPRETATIONS

XI. Dynamic Education: Content Studies 187

The meaning of dynamic education. How the child is enabled to interpret the world about him. The dynamic principle illustrated in the Montessori schools. The dynamic principle applied in arithmetic. The dynamic principle applies to all studies. Dynamic methods in secondary education. Making rhetoric dynamic. The teaching of science in the high school. Dynamic teaching of citizenship. Developing patriotism. The first step in developing love of country. We are all members of one body. The study of community life.

CHAPTER PAGE

XII. Dynamic Education: The Rôle of Suggestion . . 205

Action follows the direction of attention. The constructive treatment of aches and ills. One can intensify children's misfortunes by suggestion. The use of suggestion in the sick room. One's defects may be increased by suggestion. The morals of a community may be elevated or degraded by suggestion. Suggestion in the theater.

XIII. Overstrain in Education: Wasteful Practices . . 218

Present-day conditions that cause overstrain. The chief cause of overstrain. The need for periods of quiet. Wasting nervous energy in the home. The teased child. Noise as a nervous irritant. Overstrain in the schools. Waste from excessively fine work. Unnecessary tension in writing. Concerning pens. The typewriter is less wasteful than the pen. Postures that lead to waste of energy. The eye in relation to nervous waste. Maladjustment of ocular muscles. Maladjustment of the lens. Dr. Gould on the effects of eye-strain. Importance of the teeth in relation to saving waste of vitality.

XIV. Overstrain in Education: Conditions Affecting Endurance 263

Handicaps to endurance. Why people differ in power of endurance. Training for mental endurance. Training can be overdone. "Off days." The law of economy in developing and maintaining organs. Organs that are not used tend to degenerate. Intelligence is in the ascendancy. The price of "refined" training. Hardening the body. New social conditions make our problem a very complicated one. Overeating and under-cleaning. Health and cleanliness. Blue Monday. Energy in relation to indoor air. What are the requirements for good ventilation? The toxic effect of "dead" air. The rôle played by clothing in maintaining vigor. Energy in relation to indoor temperature. Arranging a heating system so as to overcome inequality in temperature between head and floor levels.

PART III

EXERCISES IN ANALYSIS, INTERPRETATION, INVESTIGATION AND APPLICATION

CHAPTER		PAGE
I.	Motive Forces in Development: Physical Well-being	291
II.	Motive Forces in Development: Social, Intellectual and Æsthetic Well-being	295
III.	Primitive Modes of Adaptive Activity: Trial and Success; Imitation	301
IV.	Higher Forms of Adaptive Activity: Conception; Symbolization; Imagination; Reason	310
V.	Expressional Activities: Vocal, Featural, Postural, Gestural	319
VI.	Expressional Activities: Graphic, Pictorial	325
VII.	The Development of Coördination	329
VIII.	The Development of Inhibition; the Neurological and Psychological View	332
IX.	The Development of Inhibition; Restraining Forces	338
X.	Activities Peculiar to Adolescence	344
XI.	Dynamic Education: General Principles	356
XII.	Dynamic Education: The Rôle of Suggestion	368
XIII.	Overstrain in Education: Wasteful Practices	377
XIV.	Overstrain in Education: Conditions Affecting Endurance	390
Authors Referred to or Quoted in the Text		395
Index		397

FIGURES IN THE TEXT

FIGURE		PAGE
1.	Children's Passion for Swimming and Playing Games in the Water	14
2.	Children's Passion for Constructive Activities	25
3.	The Nomadic Impulse during the Teens	29
4.	Children's Interest in Dramatic Activities	31
5.	Children's Passion for Impersonation	46
6.	The Animal Brain as Compared with That of Man	65
7.	Phrenological Chart	80
8.	Chart Illustrating Chiromancy	82
9.	Studies in the Expression of the Brow	85
10.	Studies in the Expression of the Lips	87
11.	Studies in the Expression of the Eyes	94
12.	The Evolution of the Letter *M*	108
13.	Examples of Pictorial Writing	110
13 *a*.	Examples of Pictorial Writing	110
14.	A Child's Drawing for "Jack and the Bean Stalk"	112
15.	A Child's Drawing for "Johnny-Look-in-the-Air"	119
15 *a*.	Second Drawing for "Johnny-Look-in-the-Air"	120
15 *b*.	Third Drawing for "Johnny-Look-in-the-Air"	121
16.	Fourth Drawing for "Johnny-Look-in-the-Air"	124
17.	Fifth Drawing for "Johnny-Look-in-the-Air"	124
18.	Effect of Children's Efforts to Perform Coördinated Tasks	131
19.	Activities Requiring Use of the Large Muscles Principally	132
20.	Tasks That Do Not Require Fine Coördination	134
21.	Tasks Requiring Varying Degrees of Coördination	138
22.	The Brains of (*a*) Normal Adult; (*b*) Adult Idiot; (*c*) Newborn Child	141
23.	Scene in the Vicinity of a Public School in a Large City	144
24.	Competitive Games for Girls	147
25.	Indoor Games	150
26.	Curve Showing Annual Increase in Endurance, Vital Capacity, Weight and Grip of Right Hand	170
27.	Scene in an American Dance Hall	182

FIGURE		PAGE
28.	Boys in the Early Adolescent Period	183
29.	An Educational Object Lesson	190
30.	Learning Tables of Measurement by Actual Use	192
31.	Judging Different Varieties of Corn	194
32.	Fourteen Nationalities in One School	199
33.	Plethysmographic Record from the Arm of a Sleeping Person	225
34.	Record Showing Effect of Noise on a Sleeping Subject	225
35.	Different Styles of Penholders	232
36.	A Posture Frequently Seen in Home and School	235
37.	Overdoing the Effort to Maintain Erect Posture	236
38.	Postures That Lead to Deformities	237
39.	Posture Induced by a Too High Seat	238
40.	Posture Induced by Relation of Seat to Desk	238
41.	Effect of Too Small Distance between Seat and Desk	238
42.	Posture Induced by Too Small Desk and Chair	239
43.	Posture Induced by Too Great Distance between Seat and Desk	239
44.	Proper Adjustment of Desk and Chair	239
45.	Posture Induced by Too High Desk	240
46.	Muscles of the Eyeball	240
47.	The Normal Eye	241
48.	The Shortsighted or Myopic Eye	241
49.	The Longsighted or Hyperopic Eye	242
50.	The Double Concave Lens	242
51.	Concave Lens to Correct Myopia	243
52.	The Double Convex Lens	243
53.	Convex Lens to Correct Longsightedness	244
54.	The Astigmatic Dial	244
55.	Chart Showing Astigmatism	245
56.	A Shortsighted Astigmatic Eye	245
57.	Another Type of Shortsighted Astigmatic Eye	246
58.	The Longsighted Astigmatic Eye	246
59.	An Astigmatic Eye in Which Rays Focus on the Retina in One Meridian and behind the Retina in Another Meridian	247
60.	Astigmatic Eye in Which Rays Focus in Front of the Retina in One Meridian and behind the Retina in Another Meridian	247
61.	Postures Which Determine Mental States	254
62.	Seating Which Will Secure Erect Posture	255

FIGURE		PAGE
63.	Fairhope Method of Inducing Children to Relax	258
64.	School Facilities for Relaxation	260
65.	Outdoor Calisthenics	272
66.	Competitive Games Which Develop Endurance	274
67.	The Chief Malady of the Schoolroom	284
68.	The Nomadic Impulse	294
69.	The Throwing Impulse	296
70.	Operating a Linotype Machine	317
71.	Work for Backward Children	321
72.	A Study in Expression	322
73.	A Study in Expression	323
74.	Children's Spontaneous Drawings	325
75.	Children's Spontaneous Drawings	326
76.	Children's Spontaneous Drawings	326
77.	Relative Proportions of Child and Adult	333
78.	Relations of Adolescent Boys and Girls	352
79.	Cultivating the Soil	353
80.	The Meeting-Place of the Gang	354
81.	Dynamic Methods of Teaching Pyramids and Cones	364
82.	Learning How to Take Care of a Baby	365
83.	Learning How to Make a Bed	366
84.	One Method of Lighting a Schoolroom	381
85.	Curvature of the Spine	382

PART ONE

DYNAMIC ASPECTS OF MENTAL DEVELOPMENT

MENTAL DEVELOPMENT AND EDUCATION

CHAPTER I

MOTIVE FORCES IN DEVELOPMENT: PHYSICAL WELL-BEING

A COMPLICATED subject may perhaps best be introduced by a simple illustration. In the spring one plants a bean seed in moist earth. Soon the young plant will break through the soil. Roots will push downward into the earth, and stalk, branches and leaves will appear above the earth. If there is an obstruction in the path of the roots, they will turn out of their course in order to avoid it. So above the soil, — if the space directly overhead is already occupied by another plant, the new one will bend this way or that so as to take advantage of any unoccupied space. Finally blossoms will appear and then the seeds will develop. When the seeds are matured the plant will disintegrate.

A simple illustration of the nature and rôle of driving forces

It is apparent that the ultimate purpose which governs the activities of the plant in its life career is the production of seed, and every detail of its development has reference to the attainment of this goal. It seeks to fasten itself in the earth so that it will not be torn up by the winds. It struggles to obtain moisture and constructive materials which are essential to the building of the supporting structures necessary to bear the leaves and seeds. It develops foliage as thickly as space will permit in order that it may secure and digest carbon dioxide in suffi-

cient quantity for its needs. An observer taking note of the development of the plant up to its flowering stage, but no further, might think that it developed roots, stalk, branches, leaves and flowers as ends in themselves, but he would be in error; because these are all only means to an ulterior end — the perpetuation of the species.

As one watches the plant struggling to elaborate its root, branch, leaf and flower systems, he becomes convinced that there are forces within it which continually urge toward a definite objective, often even in the face of serious difficulties. Of course, the plant must use the moisture, the light and the air in its environment in order to accomplish its purpose; but the manner in which and the degree to which these facilities are utilized are determined by the driving forces within the plant. The gardener can assist it by removing the obstacles to the attainment of its aim and by furnishing it with needed materials so that it may accomplish its object without hindrance or diversion or arrest; but this is all the gardener can do for the plant. He cannot alter its purpose; he cannot create any forces within it; he can merely assist it or hinder it in realizing its purpose.

So much by way of introduction. We may now ask — Is the direction which the child takes at every point in his development due to the pressure of internal forces as in the case of the plant, and are his activities dependent upon the interaction of these forces with environmental objects and conditions? Comparing the child when he first comes among us with the bean seed, we note that he is well-nigh infinitely complex. He has an extremely complicated mechanism which suggests that he is designed to engage in exceedingly complex enterprises. In the bean one can with the unaided eye make out all the essential mechanisms, and with the microscope he can observe them in minute detail. But with the child, most of the important mechanisms are hidden from view, and they cannot be examined at all so long as they

remain intact in his organism. It is even more true of the child's mental than it is of his physical organism, that it is so complex, even when we first see him, that no one has been able completely to examine or describe it. So it will be understood at the outset that one cannot hope to deal conclusively with all the traits and activities of the individual which indicate the directions which the motive forces in his life impel him to take.

One cannot doubt that the motive force first to be manifested in the child's life relates to the maintenance and development of his physical organism. At the moment of birth he is equipped with mechanisms which function effectively to keep the body alive; and not only to keep it alive, but also to cause it to increase in size, strength and efficiency. Upon the first contact with air the function of breathing is established, and thereafter it proceeds without much if any attention from the individual. Even before birth the heart begins to beat, and throughout life it continues to perform its duties without supervision on the child's part. Before birth, too, the mechanisms concerned in the assimilation of food and the construction of tissues begin to function, and hardly is the child born before he commences to plead for food. During the antenatal period, he secures nutrition without the use of the mouth and accessory equipment, but when he becomes detached from his mother and must secure his nutrition through the mouth, all the acts necessary to convey food to the digestive mechanisms as well as to digest it and convert it into tissues are ready to be performed. The child's sucking and swallowing activities are exceedingly complex, but normally they can be executed at birth with complete success.

Physical welfare

As one observes the child during the first weeks he cannot fail to be impressed with the predominance of the activities concerned with the securing and digesting of food. His appeals and protests during the early months have reference to the relief of

hunger more largely than to any other need. Whatever he seizes in his hands or whatever touches him on lips or cheeks he seeks to convey to his mouth. The first sign of awareness of the world about him has reference to his mother as the source of his food. And when he has secured his food he falls asleep and remains asleep while the food is being digested and assimilated. His waking periods during the first three months occur mainly for the purpose of feeding. When he has digested one meal he awakens to secure another. Normally the very young child will not run over his feeding period fifteen minutes without an appeal for food. The impulse to eat is more active than the needs of the body require, as every mother well knows; the typical child will eat more than he can assimilate. And it is comparatively so easy now to obtain an excess of food that many of the individual's troubles arise out of his uncontrolled impulse to eat. Apparently the impulse was established when food was less abundant and less easily secured than is the case at the present time; when man had to depend upon what nature in her original state offered him, he had to gorge himself in order to secure enough, because the occasions when he could secure it were relatively infrequent, and such food as he obtained was not highly nutritious. It is as though the child remembered this earlier experience of his ancestors; but he does not take into consideration the changed conditions which make food abundant now and easily secured.

Predominance of the food-securing impulse

This impulse to eat more than the needs of the body require plays a rôle from the cradle to the grave. The individual of any age who is relieved from the necessity of muscular toil normally consumes more food than his organism requires for maintenance and efficiency. Many of the ills that afflict mature individuals are due to the impulse to consume food in greater quantities than can be utilized by the organism. This impulse

apparently outlives most other impulses; the old man enjoys his food after he has ceased to take an interest in much else, and even after nature has destroyed the mechanisms necessary for the proper mastication of food and the elimination of unused portions. The disharmonies of old age probably arise mainly out of the passion to consume food beyond the measure that it can be utilized in the organism.

It may be mentioned further that social relations have to a considerable degree developed in connection with eating. Eating plays a prominent rôle in children's parties and in adults' social pastimes. Among primitive people celebrations relate quite largely to feasting; they come together for social purposes when they have secured a supply of food. The chief incitement to social festivities is good fortune in obtaining food. Even among advanced peoples, prominent festivities have relation to prosperity in respect to their crops; they give thanks to the Giver of Gifts when they have a good harvest, — when their bins are full of corn, their cellars of vegetables and meat, and their larders of flour and fruit.

In human life the impulse to secure food in order to maintain and develop the organism has largely determined the character and degree of development of muscular, nervous and intellectual structures and functions. Keeping this fact in mind it may be asked in passing, — If the individual can secure an abundance of food without the full use of body and mind, will he develop properly and completely? It would unquestionably be an aid to his development if he could not secure food so easily as he often does in these times. The individual who is frequently hungry, or at least who is not surfeited with food will develop a more capable body and more agile mind than one who is never hungry because he is continually satiated. The over-fed child is lethargic in body and dull in mind. Of course, the under-fed child suffers also since he cannot secure

nutrition enough to maintain vigorous physical and mental development. But of the two unfortunate conditions, it would probably be to the advantage of the individual in his development to experience a scarcity of food rather than to have a surplus of it. One cannot avoid feeling some concern about the future of a people whose children can secure an abundance of food for the asking, and who are never required to put forth sustained physical effort or to exercise intellectual keenness and accurate judgment in order to obtain food adequate to their needs.

Manifestly the individual could not preserve his organism from annihilation if he did not possess other impulses than those concerned with securing food. In the very beginning he must rely upon caretakers to safeguard him from destruction by hostile forces. When he is cold or his clothing is too tight or he is suffering from hunger or colic, he appeals to his mother or nurse for aid. When a loud noise occurs in his vicinity he cries for protection, as though he associated a loud noise with a destructive agent. As he develops, the range of experiences which will cause him to look to his caretakers for protection constantly increases until he gains a large measure of self-reliance. The three-year-old child is likely to be incessantly making appeals to his parents, teacher, or an older brother or sister to shield him from threatened harm, — from lightning and thunder, from strange animals of all sorts and often from familiar animals, even pets, from rough treatment by his playmates, and so on *ad libitum*. At sixteen he normally ceases to ask those about him to safeguard him from harm, for the reason that he has gained confidence in his ability to protect himself. More especially he has learned that the sources of possible harm which harassed him in his earliest years were unreal and so he no longer fears them.

Self-protective impulses

At two, three, or four years of age the child incessantly

asks his caretakers to relieve him of pains, whether incurred in his play or arising from within. Even slight discomfort will cause him to appeal vigorously for aid. Any painful accident or mishap will send him running for relief to father, mother, teacher, or someone else in whom he has confidence. His alertness in seeking immediate relief from all pain indicates that nature did not wish to take any chances in safeguarding the individual's organism from experiences which might handicap or destroy it. In the course of development this readiness to seek relief from all pain however slight becomes subdued, probably because the individual learns that many of the minor aches and pains and accidents will do no serious injury to his organism and so they may be ignored. Indeed, in time, by the ninth or tenth year as a rule, boys especially cultivate a bravadic indifference to these minor ills and misfortunes. They take pride in being able to endure them without complaint, which was not in any respect true at an earlier age. This fortitude in reaction upon slight misfortune or minor distress of any sort increases up to maturity, so that the young man or woman may undergo considerable suffering without complaint and without making any attempt to secure relief.

Conflict of motive forces

This phenomenon furnishes an illustration of the conflict of driving forces which frequently arises in the course of development. In this instance the individual is equipped at the outset with the impulse to communicate every pain, ache or accident to those who may be able to relieve him. But later there awakens an impulse, directly in contrast with the first one, which causes the individual to take pride in bearing his misfortunes stoically, and sometimes deliberately to bring pain upon himself in order that he may show his indifference or superiority to it. In seeking an explanation of this apparent conflict of motive forces, one may suppose that the very young child should freely com-

municate all his pain and distress since he is unable to protect himself from the causes thereof; but later on when he gains in power of self-protection he may be depended upon to discriminate between the minor and the major sources of danger; and in his adaptation to his environment it will be of advantage to him to cultivate indifference to all pain of lesser importance. Further, as his organism develops it acquires resistance to hostile agencies which at the outset might destroy it; and just in the measure that it increases in stability and endurance, the individual may neglect all painful experience of minor consequence because his organism can survive such experience.

Resistance to remedial treatment

A special phase of the impulse in question should be noted particularly — the attitude of the individual toward the treatment of disease and especially surgical treatment. Normally the child resists the application of remedial measures which involve the taking of medicine, the use of hydro- or electro-therapy and particularly the employment of surgery. There can be no doubt that he is equipped with a deep distrust of medical and surgical agencies. In many households there is continual conflict between adults and children in respect to the use of medicine and all remedial measures. The child can give no satisfactory reason for his attitude except that he does not "like" medicine or electric-light baths, and so on. Even when his medicines are sugar-coated he will set up effectual resistance to taking them so long as they are known to be medicine; his instinctive resistance is against taking anything which is designed to produce some change within him. At the same time he will without hesitancy eat unknown fruits or berries that he picks in the woods or along the wayside. But there is no mystery about these; he regards them in the light of fruits and berries that he knows and he concludes that they will not produce any internal disturbance. Unquestionably the hostility to medicines is an expression of

the deep-seated impulse to protect the organism from harmful agencies, although this instinct, like others to be noted later, often operates to the disadvantage of the child under present-day conditions.

When it comes to surgical treatment one can see how intense is the impulse to protect the organism from mutilation. The typical child up to the teens will in the face of great rewards resist the advice of parents and teachers to have a tooth pulled; and never will he consent to have any part of his body cut or removed, even though it may be the source of excruciating pain. As a rule, surgeons must force a child to submit to an anæsthetic in order that they may perform an operation. A surgeon of experience would never ask young children whether or not they would be willing to have an operation performed. He makes preparation for the operation without the children's knowledge of what will happen to them, for otherwise they will assume a resistant and even defiant attitude, which, however, is more reflex than deliberate.

In due time, the individual will normally reach the place where the instinctive resistance to medicine and therapeutic and surgical measures of all sorts will be held in check by the appreciation of the benefit which will be derived from such treatment; but even the majority of adults can only with great exertion bring themselves to submit to treatments which produce marked physiological effects even though they are not accompanied by much pain. Up to the last moment of life the instinct to avoid mutilation or pain is profound, and with many persons it constitutes an impelling, dominant, controlling force.

To a child, a future good in the face of a present pain is not to be considered. Beginning with the teens, though, the individual normally begins to acquire power to control instinct and impulse in view of remote benefits to be derived from such control, and with a large proportion of adults present discom-

fort or even intense pain will be endured if thereby greater good for the future will be likely to be assured. This latter attitude is probably increasing in the race. It may be developing *pari passu* with the development of intelligence, by means of which forces may be applied to present conditions in order to obtain ultimate good. In earlier times, when the framework of the instincts pertaining to self-protection was elaborated, immediate response to situations seemed to the individual to be essential to the welfare of his organism. If an experience was painful, he concluded it should be avoided because the pain would never be the result of agencies deliberately employed for the purpose of attaining remote beneficial values. This may account for the change in the attitude of the individual as he develops toward the use of remedies of every kind for present ills — his resistance to them in the beginning and his willingness to undergo them as he approaches maturity.

The impulse to seek protection from wind and weather

In connection with the preservation of the organism, which constitutes the first great driving force in development, one should not fail to inquire to what extent the individual seeks protection from the elements — from the cold, the wind, and the weather. It has already been noted that in the early months he cries when he becomes chilled, and his caretaker comes to his rescue and wraps clothing about him or makes his bed warmer. One might expect that he would show the same eagerness to secure clothing for protection as food for nourishment, but the young child manifests no activity which has relation to securing or retaining clothing. In taking his food he clings to the nipple, and if he loses it, he becomes extremely active in his efforts to obtain it again. But if he kicks off his clothing, he merely cries when he becomes cold. He seems to possess no instinct which enables him to keep in contact with his clothes. If it were not for the constant watchfulness of his caretakers, he would be

without clothing all the time. Even three- or four-year-old children who are suffering from the cold because of torn, wet, or insufficient clothing do not manifest any ingenuity respecting methods of securing relief from their distress. When they are hungry they search eagerly for food, but when they are cold they do not search eagerly for clothing. Continuously throughout the developmental period there is often conflict between caretakers and children because the latter go ill-clad or retain wet clothing. Girls in the teens frequently cause distress to their parents because of their scanty clothing — thin shoes and the like.

It should not be inferred that the individual is not concerned in any way about clothing; it would be absurd to say that the girl especially is indifferent to clothes. But her interest does not have reference primarily to protection but rather to ornamentation. After the age of nine or ten the normal girl devotes much of her attention to decoration by means of clothing; her mental equipment is exercised quite largely with respect to this matter. Neither is the boy indifferent to ornamentation by clothing after he enters the teens, but his thought and energy are not so largely devoted to this problem as is the case with the girl. One of the strongest motive forces in the life of the adolescent girl is the attainment of personal attractiveness through ornamentation, but this plays only a minor rôle in the boy's life. While the girl is spending much of her time in devising articles for personal adornment, the boy is competing with his fellows in running, jumping, climbing, wrestling, hunting, fishing, swimming, taking hikes into the woods, shooting at birds and squirrels, making caves, playing baseball, football, building bonfires, stealing apples, raiding property, and so on. A discussion of the decorative activities of the girl and the adventurous activities of the boy will be undertaken farther along.

Interest in clothing for decoration rather than protection

To return to a consideration of motive forces relating to physical protection; the child is equipped at birth with a well-developed mechanism for fear responses. The earliest responses occur in reaction to loud noises; mothers well understand this and they seek to protect their children from harsh voices or slamming doors or heavy footsteps in the nursery, or falling objects, and so on. As

Fear as a protective agent

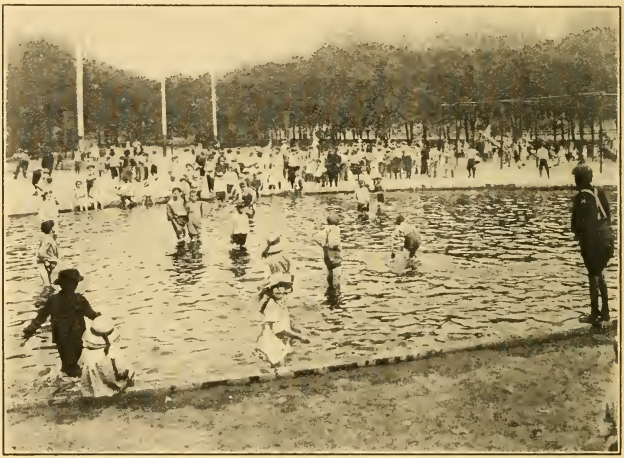

FIG. 1. — Normal children are passionately fond of swimming, paddling in pools, and playing games in the water. (See exercise 11, page 294.)

the individual develops, the range of his fear responses increases greatly for a time and then it decreases. The year-old child normally is afraid of all strange things — strange animals, strange people, strange places, strange situations of every kind. It is as though nature said to him: "Danger lurks in everything which you do not understand. Deal with it cautiously. Keep close to your protector when you are in the presence of any

new animal or person or in any unfamiliar situation. Run to your mother when you hear the thunder or a strange voice in the house or barking dogs or anything of the kind. Do not stray far from home lest you get out of reach of your protectors. Especially be apprehensive in the dark. Do not go into or remain in the dark alone because danger lurks in dark places."

A few popular writers on children's traits have advanced the theory that they would never manifest fear unless they had been made afraid. No careful observer of childhood could hold such a view. There are many records of children who have been very carefully safeguarded in every way from harmful experience or stories suggesting fear, but such children have exhibited the typical fears in the course of development. In our day the majority of parents protect their children from all experiences which will suggest fear of the dark or of strangers or of animals and so on, but only slowly do their children grow to have confidence in strange things and especially in the dark. One cannot doubt that nature has equipped the child with fear responses in order to protect him from dangerous objects and keep him out of perilous situations. Unfortunately these reactions persist for a period under changed conditions when there is no longer much if any danger to the child in the dark or in contact with strange persons or places. Only after repeated experience wherein he finds that no harm comes to him from strange persons or animals or from moving about in the dark does he gain control of his fears.

Fear as a motive force in development

Fear has played a large rôle in physical and mental development, in animal as well as in human life. The sensory and intellectual acumen and resourcefulness of animals is due as largely perhaps to the apprehension and detection of dangerous objects and situations as to the securing of food. So in the development of human intelligence, fear has played a prominent part in making per-

ception keener, memory more faithful and dependable, and reasoning processes more acute and reliable. Much of man's thinking power, speaking popularly, has been conserved because it has enabled him to resolve his doubts concerning the objects that have aroused his fears, or to escape from them or destroy them if they proved to be a real menace to his welfare.

What rôle does fear play in the development of the child's intelligence? One cannot answer this question with confidence. Even after the most careful observation of the child's activities one is unable to determine to what extent fear of objects and situations incites him to keen intellectual activity with regard to these objects and situations. To illustrate: a child is learning to go downstairs without falling. There are three factors operating to control his action: first, his desire to have interesting experiences at the bottom of the stairs; second, his passion to master the task of going downstairs; and third, his wish not to fall and injure himself. He has fallen before and he is afraid of falling now, so he gives earnest attention to the situation before him so that he may avoid his previous experience. At the same time he studies the situation carefully in order that he may repeat the pleasurable experience of getting down the stairs and then playing on the lower floor or running out-of-doors. Which is the strongest factor in stimulating intellectual activity, — the fear of harm, the passion to master a task, or the desire for pleasurable experience at the conclusion of the task?

Precisely the same situation is presented in the individual's relation to a dog. Instinctively he is afraid of it and yet he desires the experience of playing with the dog, and he observes the animal most attentively in order to determine what course he should pursue. Certainly fear is a driving force behind his intellectual processes with respect to the dog, and so

is his wish for playful experience. It is impossible to determine which is the stronger incentive to penetrating and sustained intellectual activity. It may be said, though, that the younger the child the more important is the rôle of fear in stimulating intellectual action, while the older he grows the weaker fear becomes. By the time the individual reaches the teens his intellectual processes occur primarily for the purpose of enlarging his range of pleasurable experience. They occur to some extent in response to feelings of fear, but the former play a much larger part than do the latter. In the mature man or woman fear still continues to play a part, though it does not now concern physical objects or situations, but rather social relations. The incentives to enlarge one's sphere of action and to remove obstacles which stand in the way of increasing pleasure-giving experiences constitute the principal stimuli to intellectual activity.

CHAPTER II

MOTIVE FORCES IN DEVELOPMENT: SOCIAL, INTELLECTUAL AND ÆSTHETIC WELL-BEING

The passion for experiences with persons

As early as the sixth month the child manifests a craving for experiences with persons as distinguished from things. He cries to be with his mother, and in his featural and bodily expressions he begins to show delight when his brothers and sisters come to play with him. From this point on for many years his desire to have give-and-take relations with persons is continually broadened and intensified. He often seems more eager to secure social experience than to protect his body or promote his physical well-being. As early as the fourth year a child will often leave his food to play with a companion. He will cheerfully incur physical pain in order that he may visit with his friends. A considerable part of the punishment visited upon many children from the age of four up to and even through the teens is due to their eagerness to leave their homes or their work to be with comrades. Boys and girls in the teens will often undergo hunger and cold in order that they may dress so as to win the friendship of those whom they like; they are as a rule more or less indifferent to their physical well-being so long as they can secure and retain the good-will and confidence of their friends. A youth will often endure serious physical pain without a murmur, but if he is neglected by his friends he will suffer intensely. He will lose his appetite for food; the color will go out of his cheeks; he will actually decline physically. These facts are mentioned

simply to impress the importance and to emphasize the compelling character of the motive forces that relate to social experience.

Before his second birthday the child normally evinces a tendency to display himself for the comment and admiration of persons; that is to say, he "performs" before his parents, his brothers and sisters and even his little companions. The very young child does not, of course, do this for any ulterior purpose, and it is doubtful whether the adolescent even has a distinct aim in view in disporting himself before his fellows. The individual's action is probably not determined by any conscious appreciation of its value. It is in no sense the outcome of educational influences. It may be modified by experience, but the impulse comes wholly from within.

The passion to communicate with persons is as profound as the passion to be in their presence or to display oneself before them. Every teacher knows that it is next to impossible to prevent pupils in the elementary or even in the high school from communicating with one another. Parents know how difficult it is to train a child so that he will not tell to every one who will listen to him whatever he has observed or heard or every experience he has had in the home. Nature appears to say to him: "Tell everything you see or hear or do to any one and whatever any one does to you. Keep nothing to yourself." Then nature follows this command with another: "Listen to others when they tell their experiences. If they seem to conceal anything, try to drag it out of them." Urged by this profound motive to share his experience with others and to cause them to share their experiences with him, the individual goes on to full maturity and in fact throughout his life communing with his fellows. This passion to communicate never subsides, though it may take different directions with different persons, and it may become narrowed with development so that

The passion to communicate

an individual may become reticent with respect to some persons and certain kinds of experiences; but when this is the case he is likely to become all the more communicative in his relations with special groups of persons and in respect to particular sorts of experience.

The strongest force of all: the wish to secure the good-will of one's fellows

Perhaps the supreme desire of the individual after he passes his tenth birthday is to secure the confidence, good-will and esteem of his fellows. He wishes to be thought well of by them. At nine or ten his attitude is wholly unreflective; he responds solely to the urge that comes from within; but at the same time he is governed very largely in his actions by his wish to have his companions admire him, speak well of him, praise him, come to visit him, and the like. He does his level best in order that he may secure these expressions of approval from his companions. This furnishes a constant spur to the development of his mental powers. His intellectual processes are quickened by his passion to act so as to win approving expressions from his group. Fortunately the group as a rule commends activities which tend toward the betterment of group life. When a dull boy and a bright boy perform before the group, the bright boy will receive the praise because he can do more things than the dull one and do them more skillfully and readily. Even a group of very young persons will approve skill and ability as contrasted with incompetency, and thus the group exerts a constant pressure upon the individual to do his best, not only intellectually but physically, — to jump as high as he can, to run as fast as he can, to throw as far and straight as he can, and so on *ad libitum*. In due course the approval of the group will become an incentive to ethical action. Even a six-year-old child discovers that he must not "tattle" on his fellows; he must not be a "cry-baby"; he must not appropriate what does not belong to him; he must take his turn in games; he

must not be a "quitter"; he must not be a coward; when he is attacked he must defend himself and his group, and so on. The older the individual grows the more clearly he learns these lessons under the unconscious tuition of the group.

In his social adaptation the individual meets resistance, of course, just as he does in his physical adjustment, and he is equipped with a profound impulse which leads him to seek ways and means to overcome social resistance, just as the plant bends this way and that in order to surmount barriers to its development. The principal social obstacles which the individual encounters are persons who prevent him from securing praise and rewards from the group. Any boy who can run faster, jump higher, play better baseball than the individual can well be looked upon as an obstacle to the attainment of the latter's ambition to gain the approval of the group and stand well with it. Nature urges the individual in such a case to put forth every effort to surpass the one who is attracting the favorable expressions of the group and who threatens to withdraw attention wholly from himself. The individual feels this urge as envy or jealousy, and it leads him to practice various arts and devices either to subdue those who excel him or to make a supreme attempt to outdo them. All through the developmental period the individual feels and responds to this driving force to subjugate rivals or to outshine them. Mental and physical powers alike are incessantly stimulated by this passion. A child from whose equipment this impulse should be omitted would be inert in many situations in which individuals are normally most active, and one powerful incentive to development would be lacking. It is probable that this driving force continues to play a prominent rôle in the adult period in stimulating the individual to retain the powers which have been acquired during the developmental process.

Rivalry as a motive force

In the outworking of this impulse the individual exhibits attitudes of resentment and aggression. He becomes angry when anyone stands between him and what he desires. In the early years his anger may even be vented on inanimate objects, if they appear to impede his progress in attaining his desires. But as he develops his angry attitudes become limited more and more fully to living things and especially to human beings, and when a particular person threatens the individual's standing with his group for a considerable period, his anger is likely to become permanent and settled into a fixed attitude of hatred. The very young child's resentful and aggressive attitudes are temporary; they come and go with great rapidity, but when he enters the teens they begin to be more enduring, and once anger is aroused it is not readily subdued. It is not as easily aroused as in the earlier years, but it is not as easily overcome either.

Resentment and aggression

When the individual meets social resistance, nature appears to urge him to exert himself with a view to breaking down the barriers. If necessary, he must employ physical force to subdue the individual who stands between him and the praise of the group or the attentions of some member thereof. Every observer knows how quickly a boy will fight and a girl will snub a rival. In the earlier years it is enough that one should have the appearance of being a rival in order to arouse the individual's pugnacious or snubbish attitude. Again, it is enough that a boy of eight or nine should have a reputation in a school for being a good fighter, in order that he should arouse the ambitions of his fellows to contest the honor with him, though he has never in any manner or degree stood in their way or deprived them of any objects which they wish to attain. The mere fact that he has a reputation for superiority in respect to this activity is an incitement to other boys to attempt to deprive him of his distinction. They do not know why they wish to fight; they do so almost if not

quite reflexly in response to the drive that comes from within. This passion to reduce a rival from a leading to a subordinate position compels the individual to try to attain keenness and strength in order that he may overcome his rival.

Submission to leadership as a motive force

The individual normally feels an incessant urge to become the leader of his group. But he may discover that a rival has superior strength, ingenuity and courage; and when this fact becomes thoroughly established as a result of competition and various encounters, then the individual responds to an impulse directly contrasted with the impulse to lead — that is, he is impelled to submit to the leader, to see how he can gain his favor, to hold his own desires in check instead of to plan how he can outwit, outdo, or outfight the leader. He must now be keen to discover what the leader wishes and he must be ready and enduring in carrying out the leader's mandates. In other words, he must submit to authority and he must conduct himself so that his chief will think well of him. When an individual fully realizes that he cannot become a leader of a group himself his dominant aim then is to become the leader's favorite. The leader may be his parent, his teacher, his minister, or the policeman in the district in which he lives; or it may be one of his own group. It should be added that the impulse to lead arises earlier and is much more powerful than the impulse to follow. The latter appears only when the former is effectively blocked.

The urge to gain knowledge for its own sake

The driving forces in bodily and mental development mentioned thus far have had relation to the protection and promotion of physical and social well-being; but it is important to point out before going further that the motives inciting to intellectual activity are not designed solely to advance physical and social welfare. The individual early feels an urge to gain knowledge for its own sake. As the body has its characteristic needs, so the intellect

has its special needs. It may be true that intellectual function originated to safeguard the body and to secure social adaptation, but in the process of development it has acquired a measure of independent existence. Lack of harmony between the body and the physical environment is felt as physical pain, while lack of harmony between the intellect and its environment is felt as mental and nervous strain and stress. Intellectual adaptation is as real, if not as extensive or as imperative in the life of the individual, as physical or social adaptation.

The earliest manifestation of intellectual need is seen in the child's tendency to pry into situations which are not understood. Every parent knows that this tendency is at the bottom of much of the trouble which the child causes in the home. Always he is trying to have informing experience with objects or situations which he does not understand. The so-called destructive impulse as it is manifested in the early years is mainly but one form of the desire to have experience with unknown objects which will reveal their characteristics. It is not intended to imply that the child is aware of an ulterior end in his destructive activities; he is no more reflective regarding the adaptive value of these activities than of the other activities which have been discussed in preceding paragraphs. He pulls a clock to pieces, because he must do so in response to an urge from within; but nature apparently anticipates that when he does this he will find out something about the construction of the clock, though he is not eager to learn nor is he conscious that he is learning anything.

The constructive impulse as a motive force

The constructive impulse furnishes another illustration of the passion to gain experience with objects which will give understanding of their traits and of the uses to which they may be put. The child in his nursery constructing houses and bridges with his blocks is learning the characteristics of the objects which he constructs. He is not aware of any motive except the gratification of his

passion to construct, but there is a deeper meaning in this impulse. A child normally enters the constructive and also the so-called destructive period before his third birthday, and once he gets started in these activities they play a large rôle in his career for the remainder of his life, or at least until he attains

FIG. 2. — Normal children up to and often through the teens eagerly seize upon every opportunity to construct buildings or other designs with blocks or any material suited to the purpose. (See exercise 6, page 297)

full maturity. In these activities the child's intellectual processes are incessantly stimulated. Every capability of mind is urged to its full capacity under the drive to find out how things are constituted, what can be done with them, and how they will respond to the individual's operations upon them.

The mastery of school studies depends principally upon the driving force to learn for the pleasure knowledge itself gives.

Even the first day in school when the child learns words, letters, or figures, which might not appear to have any attraction for him, he is nevertheless urged forward partly, though not wholly, by the pleasure he experiences in mastering them. When he can solve a problem of any kind he may be as pleased as when he can hit a mark every time he tries with a stone or an arrow, or when he can perform any muscular task confronting him. This eagerness to learn the technical elements of school studies might not constitute a sufficient drive to hold the child to his task, but a skillful teacher can make it play the leading part by endowing letters, say, with individuality and perhaps with personality, and so coupling them with objects that appear to have possibilities of good or ill for him. Nature evidently has not equipped the young individual so that he will be greatly interested in objects that do not appear to have any characteristics which would make them of consequence to him in his daily life; but in time he may come to see that all things possess traits which when discovered will in some measure gratify the desire to learn for the pleasure of knowing.

The impulse to solve intellectual problems

It should be noted here that the desire to master intellectual problems plays a rôle in the individual's activities much like the desire to master motor or social problems. Just as he is urged to overcome physical or social resistance, so he feels an urge to overcome intellectual resistance; that is, to see through or think through a thing which he does not understand even if the thing does not in itself appear to be of importance for his physical or social adaptation. One may see even quite young pupils applying themselves to an arithmetic, grammar, geometry, or history problem, for instance, merely because it is a problem which has not been seen or thought through. So long as it remains a problem the individual feels a driving force to continue his attack upon it, provided there is a chance that he can solve it. This wish to

interpret what is unknown in terms of what is understood is with most individuals a sufficient stimulus to keep them in an aggressive attitude toward their problems until they have been subjugated, so to speak. An unsolved intellectual problem is felt in the individual's consciousness as an unconquered obstacle to his progress, and so he cannot rest until he has mastered it. This drive toward intellectual mastery is not sufficiently appreciated by those who maintain that the individual's intellectual processes are incited wholly by inherent interest in the objects or situations which he confronts.

Too great importance cannot be assigned to the rôle which is played at practically every period in life by the impulse to enlarge the range of one's understanding in order to relieve doubt and subdue fear. Many writers have neglected this aspect of intellectual function. They have minimized the distress which arises from doubt and fear of the unknown and the confidence and comfort which are derived from understanding. One who will without prejudice follow the development of a child can hardly escape forming the conviction that gaining a comprehension of objects and situations which have not been understood affords genuine pleasure, while lack of understanding is a constant source of strain and stress and discontent.

The choice of the beautiful and avoidance of the ugly

Lastly, attention should be called to a driving force which plays a rôle in every normal individual's development — the wish to increase the objects and situations in one's *milieu* that are regarded as beautiful, and to remove or destroy the objects and situations that are regarded as ugly. It is impossible to say at precisely what age a child shows appreciation of harmonious colors or forms or arrangement of objects or beautiful melodies; but most observers have noted that normally before the individual is five years of age he manifests preferences among colors and forms and arrangements of objects and combinations of musical

sounds. By the age of fifteen he is very strongly attracted by some colors, forms, arrangements of objects, and melodies, while he is repelled by others. Those that attract him he calls beautiful or lovely and so on, while those that repel him he calls disagreeable or ugly, and he responds actively to the impulse to augment the former and reduce the latter. A considerable portion of his intellectual processes have relation to increasing the beauty around him and reducing the ugliness. Much of a girl's intellectual activity, as suggested in previous paragraphs, is concerned with securing beautiful adornment. If that impulse were left entirely out of her life and nothing of a similar character were put in its place, the girl's mental development would suffer. The man does not feel so strong an urge as the woman to differentiate between beautiful and ugly environments and to increase the one and diminish the other; but even he is not neutral in respect to these values. He often feels an impulse to differentiate between the beautiful and the ugly in relation to his own person less keenly than he does in relation to his possessions — his house, his barns, his lawns, his carriages and his automobile, and the like; but the woman feels it in relation to her own person as well as her possessions.

We may now ask whether we have noted all the driving forces which impel the individual to act and which determine the direction of the movement of his mind and the development of his body. We have mentioned all the forces that are of direct service in the individual's physical, social, intellectual and æsthetic adjustments; but he indulges in activities which are not of service in any of the ways mentioned. For instance, we observe boys playing baseball, throwing stones at windows, fishing, shooting at birds, climbing trees, taking hikes into the woods, preying upon the property of farmers, stealing objects from the carts of peddlers, playing marbles, hide and seek, tag and similar games. These

Activities reminiscent of ancestral life

activities have no direct bearing upon adaptation to physical, social, intellectual, or æsthetic environments. Undoubtedly the individual gains in physical development through all these activities, though no one of them is precisely adapted to any physical act which he will have to perform in daily life. Again in carrying on these activities, intellectual processes are awakened

FIG. 3. — Boys in the teens, and sometimes earlier and later, are easily led into the life of a tramp. (See exercise 4, page 296.)

and sustained; but it is improbable that the individual in his actual adjustments will use the intellectual processes in the way in which they are called into play in the activities mentioned. These activities cannot be regarded as a sort of preparation for the needs of later life as some writers have maintained, nor can they be accounted for on the supposition that the individual possesses a surplus of energy which seeks an outlet in these

directions, for the reason that his parents, teachers and others are constantly striving to have him use his energies in other ways than those in which he chooses spontaneously to employ them. And further, it is a matter of common observation that a boy will engage in such activities as have been mentioned when he apparently has little energy left for the work which he has been performing in school or on the farm or elsewhere.

There seems to be no satisfactory explanation of the activities mentioned except that they once were performed in a serious way by the individual's remote ancestors, and they remain to-day as reminiscences, so to speak, of the earlier life, just as there are rudimentary structures in the human body that are remains of organs which once played a rôle in the adaptive needs of our forebears. In the words of President Jordan — "In the bodies of most animals there are certain incomplete or rudimentary organs or structures which serve no distinct useful purpose. They are structures which, in the ancestors of the animals now possessing them, were fully developed functional organs, but which, because of a change in habits or conditions of living, are of no further need, and are gradually dying out. Each of these vestigial organs tells a story of some past adaptation to conditions, one that is no longer needed in the life of the species. They have the same place in the study of animals that silent letters have in the study of words. For example, in our word *Knight*, the *K* and *gh* are no longer sounded; but our ancestors used them both, as the Germans do to-day in their cognate word *Knecht*. So with the French word *temps*, which means time, in which both *p* and *s* are silent. The Romans, from whom the French took this word, needed all its letters, for they spelled and pronounced it *tempus*. In general, every silent letter in every word was once sounded. In like manner, every vestigial structure was once in use and helpful or necessary to the life of the animal which possessed it."

In the same way we may suppose that the throwing, hunting, fishing, preying, nomadic and hide-and-seek activities indulged in by the young remain as vestiges of activities once performed as a matter of necessity. Nature seemingly conserves activities as she conserves organs that have played a useful rôle — only slowly do they disappear. She does not eliminate structures or actions as rapidly as she changes the

FIG. 4. — Children of all ages love to dramatize Indian life. (See exercise 5, page 296.)

environments to which the structures and habits have ceased to adapt the individual, so that he finds himself provided with physical and mental organs and traits which are not now of service, though they tend to become functional. If there had been no change in environments since the activities referred to had been elaborated originally, they would be directly serviceable now. Nature evidently is not willing to take a chance; she will have them performed anyway against a possible time of need.

It should be specially noted in this connection that there are forces operating on the individual which tend to restrain rudimentary mental traits. From the moment of birth the environment exerts an influence upon inherited tendencies, conserving those of special service by causing them to be repeated constantly, and eliminating those that are useless or harmful by attaching a penalty, natural or otherwise, to their performance. The play of the young cub, tiger, or wildcat grows ever more strenuous as development proceeds, until it passes by regular stages into the stern and momentous activities of maturity. But the kitten of our firesides rarely takes life very seriously. Its preying and combative instincts are usually kept in leash; and if they should break through the inhibitions which the environment tends to establish, the creature would be made to realize that such a thing must not occur again. So the forces operating on the cat in domestication tend always to foster a peaceful, non-combative existence, while the forces in feral life tend always to develop ferocity as the essential requisite for survival in such an environment. The principle applies more profoundly in the development of the human child than of the kitten, puppy, or any animal. The social environment will not permit nature to pursue her course unobstructed in the individual's development. It is of little consequence to the child's associates what methods nature pursues in building his body, but the moment he begins *to use* his body, to become active, then the social environment manifests an interest, for every act of the individual has a social bearing. The child liveth not to himself alone, so that he cannot conduct himself as he chooses, irrespective of the way his action affects others.

Environment vying with hereditary forces

Suppose a child impulsively appropriates the property of his fellows, or tells falsehoods to shield himself, or flies into an angry passion whenever he is crossed. Note how the environ-

ment, expressing itself through the parent, the teacher and the minister, swoops down upon the offender, and impresses upon him the necessity of refraining from such conduct. He cannot pursue his native course, outlined for him by heredity, unless it should happen, which is quite improbable, that this course lay parallel in every part with the course insisted upon by the social environment. Most of the punishment and correction of childhood and youth is necessitated because the social environment will not tolerate action which is hostile to the rights and welfare of the group.

Then there is another factor which prevents heredity from playing so prominent a part in mental as in embryological development. The child is born into an advanced social order, and as soon as he begins to differentiate people from things, he commences to imitate the former. He aims, though not consciously, to become like the persons around him, and this leads him to adopt modes of conduct quite at variance with what he would choose if he followed the promptings of heredity alone. No one can think of the body as it is being built imitating some mature body; but this is the chief characteristic in mental development. One who has even a slight understanding of children must know that their activities are determined very largely by what they see and hear going on around them. A child or a youth will imitate his elders in their manners and general ethical and social conduct when he would not spontaneously and natively do as they do at all. And in copying them he becomes like them, adopts their modes of behavior, which greatly shortens his task of becoming a genuine social being. If he were compelled to wait upon heredity alone for the development of the highest ethical and social action, he would move forward very much more slowly, and reach his goal very much later than he does now, if indeed he would reach it at all.

The rôle of imitation

It may be said in summary that mental development is the resultant of two sorts of forces acting upon the individual — physical heredity, that which is fixed in the organism before birth; and social heredity, that which he must in some part assimilate by imitation and learning. All the valuable discoveries of the race — material, social, ethical, æsthetic — in its well-nigh infinitely long struggle to reach civilization are preserved in its literature, its educational and other institutions, its government, its traditions, its customs. These constitute the social heredity of the child; and while they may to some extent run parallel with his physical heredity and reënforce it, nevertheless as the race advances it is constantly abandoning modes of conduct of a narrowly egoistic character, and putting emphasis upon broader altruistic action. But physical heredity tends to preserve the ancient régime, and make it the most important in the individual's life. That which comes late in racial evolution is very unstable in physical heredity. But in social heredity that which is late in racial achievement is chiefly preserved, and this is in many vital respects hostile to the profoundest impulses of physical heredity.

Two forces acting on the child in his development

CHAPTER III

PRIMITIVE FORMS OF ADAPTIVE ACTIVITIES; TRIAL-AND-SUCCESS; IMITATION

The world which the infant enters at birth impinges upon him in many ways, physical, social, æsthetic, but he does not react upon it except to express his satisfaction in a general way, and to swallow his food which he finds ready at hand. He is dependent entirely for his existence upon the services of his elders, who have learned how to adapt themselves to the forces acting upon them. He is more helpless during the first few months of life than the chick, the calf, the colt, the kitten, or the puppy. Yet he is not inactive; on the contrary, he is in action most of the time during waking moments. But his activities, except in a few instances, such as grasping a pencil placed in the palm of his hand and sucking any object put in his mouth, have no purposeful relation to the world about him. They are *impulsive*, using Preyer's term, or *spontaneous*, the term employed by Bain, Miss Shinn, and others. Even before birth there are activities of an internally aroused character; they occur in the embryo before the reflex mechanism is capable of functioning, so they cannot be of the nature of responses to the environment. In his observations on the development of the chick, Preyer found that movements occurred which must have been incited from within; there was no external stimulus to arouse them, for they appeared without any alteration in the surroundings, so far as he could tell. These primitive movements are probably due to the more or less spontaneous release

The helplessness of the infant

of energy generated during the process of metabolism in developing nerve centers. Höffding calls attention to the fact that the simplest organisms have the power of moving without being stimulated from without. Internal changes liberate energy, as in the case of the amœba. This power is possessed by all organic cells. The reason for speaking of this type of activity must not be lost sight of; it has no direct connection with adaptation to the environing world, although, as we shall see, it furnishes the data out of which adaptive activities may be developed.

During the first twelve or fifteen weeks of the child's life, and for a longer period probably in many cases, a variety of stimulations produces lively activities in him, but yet one could hardly say that he was responding to his environments in an adaptive manner. Rough clothing, for instance, will incite activity in the child's legs and arms and vocal organs, but these are not specifically related to the source of his troubles or the way to remedy them, though some persons would say that the child feels a sort of instinctive confidence that by kicking and crying relief will be obtained. Looking at the matter neurologically, we may say that dermal irritation arouses impulses in the central nervous system, and these follow nerve routes which have been employed by the child's ancestors in the production of these simple and very general protective actions. The infant's responses are practically all characterized by lack of definiteness and of specific appropriateness which would make them effective so far as his initiative is concerned, though some of his actions are suited to arouse his caretakers to serve him. Observe a four-months-old child when he sees his mother after a period of separation. He is evidently eager for her to take him in her arms, but he cannot do much on his own part toward bringing about the desired end. He is active enough, but his actions are not properly correlated with the object arousing

them, and with regard to which he wishes to establish intimate connections. From one point of view there is method in his riotous activities; but if he had not been cast amid friends who are alert to catch every expression so as to serve him, he would fare badly indeed. The infant can only express pleasure and displeasure in a general way, and he must wait upon others to decipher just what his condition is and to minister to his needs.

All students of mental development have noted this first epoch in the child's career. Whatever actions he performs that appear to have rudimentary intelligence in them are, as a matter of fact, of a spontaneous or reflex character. His hands roam about aimlessly, or with only the most general aim of encountering some object accidentally, and when they come in contact with an object, they set out with it on the journey to the mouth. But he is probably quite unaware of precisely what occurs, and not at all responsible for it in any conscious or volitional way. It just happens; and he is in all likelihood not even an appreciative onlooker at the outset.

Morgan can hardly have an infant in mind when he says that as he is "gazing about here and there, a sweet is brought within his range of vision. So soon as it falls within the margin of the visual field, the eyes are so moved as to bring it to the focus of vision; the hand is even stretched out to touch and seize it, and it is conveyed to the mouth." Such an act would be impossible without a great amount of preliminary experience of a kind to be described presently. The earliest I have seen an infant perform a purposeful act was in the fourteenth week. Then she placed (in a faltering and uncertain way, it should be added) both hands upon her mother's face while she was looking at her. This was probably not a mere accident, for the act was repeated within the space of a few minutes, and there was not much random movement accompanying it. It is, of course,

extremely difficult to tell just when such a deliberate act occurs for the first time, since the child may accidentally hit the mark, and the observer is likely in such a case to be deceived.

For a number of weeks, the child's activities are wholly spontaneous or reflex, all running in a few ready-made routes. But by the fourth month there are evidences that some correlation between particular situations and adaptive responses thereto is beginning to take place. At the outset this comes about accidentally while the child is indulging in spontaneous movements in the manner indicated above. Complex series of data chance to come into consciousness at the same instant, or in immediate succession, and they tend to adhere together in the way they were experienced, thus making a sort of pattern of a special experience. There will be data gained from vision (*a*), as a bottle of milk and the appearance of the hand in reaching it; data gained from extension of the arm (*b*); from touching the object (*c*); and grasping it (*d*); from conveying the hand to the mouth (*e*); and gustatory data (*f*). Now these several partial processes tend to hold together in this particular pattern (*a-b-c-d-e-f*), which has yielded agreeable sensations and has proved serviceable in adaptation, and the tendency will be for the pattern to become completed whenever the first factor thereof (*a*) comes into consciousness. Of course, it is a long struggle with alternating success and failure before this complex act will become so definitely established that it may be performed readily and with certainty.

The first step in acquiring adaptive activities

It should be remembered that the child's earliest response to his bottle involved general activity of his body, arms, features, vocal apparatus, trunk and legs. The visual stimulation apparently energized the entire motor system, and as a result the child's hand accidentally came in contact with the bottle, and reflexly it closed upon it and conveyed it to the mouth. Now,

in making this adaptive act the energy set free by the sight of the bottle must be directed into the particular motor channel necessary for the execution of the act, with the suppression of random non-adaptive actions. It is essentially a process of specialization wherein a particular motor response becomes connected with a particular visual situation. We must suppose that this connection is made in the central nervous system upon repeated experience because the adaptive act is pleasurable and tends to persist over random non-pleasurable or neutral actions. The same effect would be produced if the adaptive act were painful; either pleasurable or painful acts become established more readily than neutral ones.

The chief requisite in the development of deliberate out of random movements is that the attention should first be directed upon the *method of performing* the movement (which occurs in the first instance spontaneously) and its outcome. Of course, the learner's ability to attend to the details of an act he is learning must at the outset be very general and non-specialized. He probably cannot "see" in a much more particularized way than he can execute, though the *modus operandi* of accomplishing an accidental act may to some extent doubtless become consciously apprehended. This results in fusing into a system or series a number of inherently unrelated events. Then later when attention is directed upon what was originally a separate term of the series the whole will tend to become reëstablished. But the learner must attend finally to the *object to be dealt with,* which includes the object as a thing of perception and its value for the individual. The motor elements in an act speedily become marginal.

The principle is illustrated in the case of an adult learning golf or tennis. At the outset he gives focal attention to his stance, the manner of grasping the club or racket, the swing, and so on; but very soon these elements are lost sight of, and

the player simply *keeps his eye on the ball*. As one observes children learning to adapt themselves to the world, every sign indicates that they are conscious finally of objects to be dealt with and their values; and the muscular processes required for adaptation occupy a marginal position in attention. Bain cites an instance of a type of movement claiming explicit attention — the moving of the ear — which, it is easy to see, might, if it should occur spontaneously, be sufficiently novel to attract attention. There would be no objective end toward which the movement would be directed, and so attention could occupy itself wholly with the sensations arising from the movement itself. But actions like this are of such slight importance that they may be left out of account, and the principle may stand, — that in deliberate action the attention of the learner becomes centered on the ends to be attained, and not on the means of attaining them. Of course, viewing the matter logically, the learner must take account of all his movements, and note which succeed and which fail, and choose the former and reject the latter; and while this may be true when the ends he wishes to attain require very complex adaptive processes, still it does not appear to be so true of most of his actions.

A concrete example of acquiring a voluntary act

In V.'s twentieth month an experiment was made in teaching him to throw a ball toward the ceiling. He had had experience in tossing a ball, and it had often gone in the direction of the ceiling, but probably always without deliberate attempt to send it there. Now when he *tried* to perform this particular act his arm and indeed his entire body became rigid, he could not let go of the ball at the proper moment, and when it finally was released it went toward the floor. He made a great effort to do it, as was apparent from the tension of the muscles in his face and body and in the hand not used as well as the one employed. He kept

at the task for several minutes, and as the muscles became less tense and the ball was released more readily, he succeeded in giving it an upward direction a few times, though it did not reach the ceiling in any case. Nevertheless, he was greatly pleased at his partial successes, and he wanted to keep trying it. The experiment was repeated every day for some time, with the result that at the end of four weeks there was no longer any doubt that he had acquired the ability to throw the ball up *when he wished to do so.* Most of the original strain and tension and random movement had disappeared and a voluntary, adaptive movement had been established by the method of selecting the successful processes out of the mass of actions, most of which were not essential to the performance of the task.

V. was tested at about this time in executing other simple acts which he had never performed deliberately; for instance, in turning a key in a door lock. He apparently regarded me carefully while I turned it, and then he took hold of it and pushed it backward and forward. He was unable to reproduce just the thing he observed. He probably saw *only what was nearest to what he had previously done.* When he took hold of the key he pulled it in and out, because this was the sort of reaction that had occurred in similar situations in the past. After he made a number of unsuccessful trials, I took his hand and turned the key for him and repeated it a few times. Then he caught the idea and worked away by himself, pulling in and out more than turning at first; but he had the notion of how the thing was to be done, and it was not long before he was master of the art. These examples are typical of innumerable instances that one who observes young children may note, all of which will conform to this general principle of learning — selecting special, successful, adaptive acts out of a mass of general, random, non-adaptive acts.

To sum up the principles thus far developed: In the acquisition of any new act there is normally an excess of action involving muscles which should remain quiescent, or practically so. The novice is unable to energize just the muscles in just the coördinations he wishes; new actions must always be differentiated out of a mass of more general activities. When V. was learning to throw the ball toward the ceiling, much of his fundamental muscular system appeared to be in action, and the same thing could be seen when he was working at the key, when he began to write, and so on *ad libitum*.

Learning involves excessive activity

Every adult should know that whenever he is called on to perform some entirely new act of skill, he usually energizes practically the whole of his body on the first few attempts, and that it is only after many trials that he is able to perform the act directly and simply without going through irrelevant actions. The *raison d'être* of these unnecessary actions appears to be as follows: a novice attempting a new act does not know what movements or combinations of movements will produce the desired results, and he therefore runs the whole gamut of the movements which he has previously performed. He tries them in different combinations and finally, sooner or later, strikes the right one, the one that brings with it the accomplishment of the desired end.

Bair illustrates the principle by citing experiments upon adults in energizing the muscle which moves the ear. He first moves it mechanically by electrical stimulation, which gives the subject some data of how it feels. Then the subject, endeavoring to enervate the special muscle, enervates a number of other muscles about it; but through direction of attention upon the peculiar sensations of the movement, the latter gradually gains an independent value in consciousness, and the attention acquires the power of isolating it until finally it can be executed

by itself alone. This is exactly such a process in its characteristic features as can be observed in all the child's learning of new activities.

The reason the child cannot voluntarily wink one eye when he first makes the attempt, though he can readily wink both eyes, is because the wink-one-eye reaction has no distinct meaning or cue in consciousness. He has a wink-both-eyes cue, but he has no wink-the-left-eye cue. So he has a general purse-the-lips cue, but no suck-in-with-the-lips cue. The principle has universal application at every stage of mental development. The adult learning to pitch a curved ball has a project-straight-ahead cue which will enable him to send it forward, but he lacks the simple-twist-of-the-wrist cue which will give his ball a rotary motion. This he must gain as a process partly of specialization of the general projecting movement and partly of adding a factor to the original movement. The same is true, of course, of his learning tennis, billiards, golf, or any manual art. Take again a man learning to pronounce German, say *Ich*. He has the fundamental combination, that denoted by *Ik* perhaps, because this is nearest his experience, but he lacks the peculiar factor which differentiates *Ich* from *Ik*, and this special factor he acquires by differentiating it out of the general combination. So look where one may he will always see an individual, be he young or old, who is learning an act of any kind, trying to differentiate the special movements which make it new from the general and familiar complex in which they are incorporated, so that the new act may be executed without unnecessary accompaniments. To facilitate the process of discovering the special movements, it seems that nature has taken pains to provide all young things that have to *learn* activities — that do not live out their lives largely on the plane of originally set-up activities as the chick does — with the impulse to be incessantly in action. Out of this exuberance

will develop in time the new activities which the individual wishes to acquire. There appears to be no way to secure advance except through this excess action or experimentation.

It should be noted further that as the individual discovers more and more complex activities, the simpler ones decline to a certain extent, or become subordinate. S. greatly enjoyed reaching for his mother's face from the beginning of the fourth month on, but after the seventh month he seemed to be less interested in this activity, but spent most of his minutes at mealtime engaging in little games. The original action occurred thereafter only as it was one of the elements in a more complex series constituting some game. The example is typical of most of the activities performed throughout the whole of the developmental period. It seems that when one is mastering an activity he repeats it in practice only until it can be performed with surety. When the child begins to walk, he soon abandons the original creeping movements which he once practiced so enthusiastically. At eighteen months the child is practicing running, climbing stairs, tearing paper, and so on; but at five years he does not engage in these activities except as they are essential elements in more complex ones. The child of five runs to catch people or to run away from them, or to roll a hoop, and so on, whereas in the beginning he practiced running with no such ulterior end in view.

The integration of simple acts into more complex adjustments

At eight H. is busy a good deal of the time in reading, playing at society with her companions, caring for her doll, cutting patterns out of paper, producing designs with her paints, using her pencil in drawing, and so on. At three years there was little interest in activities of this sort; instead she was climbing, running, pounding, and, in short, using her muscles in all manner of ways for the pleasure of exercising them in the accomplishment of very simple feats. But now she has reached

the point where she can perform these simple tasks easily, and she seems to have forsaken them. The principle is illustrated again in the use of language. By the twelfth month or thereabouts the child's vocalizations occasionally correspond to some of the words spoken in his environment, and with the aid of his elders he often detects the resemblance. Then he repeats the combinations continuously until they are mastered, when he ceases to practice them. But whenever he makes a new acquisition of any of the words he hears about him, he keeps going over them until they are fixed in habit. This tendency is seen even in maturity. An adult is inclined to repeat to himself a strange word until the vocal mechanism becomes adapted to express it readily.

Little is learned *de novo*

It should perhaps be said in qualification of what has gone before, that it is impossible to believe that the child could learn absolutely *de novo* such adaptive actions as have been referred to. The experiences of the race in correlating movements appropriately with the environment must prove of marked advantage to the individual in his own learning. We have seen that the child possesses a few original adaptive movements; and why should not the basis for others be laid in physical heredity, so that with a relatively small amount of experience they may be made definite? One can hardly conceive how the child could so rapidly become possessed of such a vast number of adaptive movements as he acquires if there had not been some preparation made for them by his ancestors. It seems probable that many, perhaps most, of the child's serviceable actions which he appears to acquire *ab inito* are really partly original. A certain amount of experiment is essential in order to make these half-instinctive actions effective, but something has been accomplished in this direction before the child comes among us; the routes have been opened up and have been traveled over a certain amount,

and they need only a little smoothing out to make them passable — some much less than others, of course. If one will follow a child day by day from birth onward, he will see adjustments being learned so speedily and with the detailed steps so obscured that he is forced to the belief that there must have been considerable original preparation for these adaptations. It is suggestive to compare the speed with which the child makes some of his very complex adjustments with the laborious way

FIG. 5. — Children love to impersonate the characters they see, or read about. (See exercise 39, page 309.)

in which the schoolboy masters the relatively simple act of writing, for which no specific preparation has been made apparently.

Imitation as a form of adaptive activity

In the preceding paragraphs we glanced at the development of that variety of adaptive actions that enables the individual to deal with the objects in his environment. For the most part these have to do with obtaining or avoiding or manipulating things or seeking places of refuge, though some of them, as jumping, for example, do not appear to have such an end in view directly. Still even

in this last sort of action the actor seeks to bring his body to a given point; and this amounts — so far as intellectual function is concerned — to his trying to secure the point as an external thing. Keeping in mind the general principle involved in learning these adaptive activities, we must now turn to activities of a special character. If one will make up a face before a child of three who is not deeply engaged at the moment, it will probably be reproduced at once more or less completely, and commonly without deliberate intent on the imitator's part. His action will occur as a sort of echo of the copy. When children are learning to talk, at two years or so, they often repeat the words they hear about them in a parrotlike way, seemingly as mechanically as a musical instrument, a piano, for instance, will sometimes respond to the tones of the human voice. And language is mentioned merely as a typical activity.

The phenomena of mimicry

The phenomenon in question is too familiar to require many instances in illustration, though Cooley has registered an exception to the prevailing view that children are great imitators. He thinks they like to be let alone to work out their own ideas. But from what source do their ideas come? Of course, every normal child wishes to carry out his own undertakings; he does not like to have an adult or anyone else break in on his activities; but this does not mean that he is not an imitator. It simply means that he desires to be left free so that he may imitate, that he may by his own effort reproduce what is going on about him. He does not want someone else to do his imitating; this is probably the explanation of his resistance to adult interference.

It is clear that, considering the needs of adaptation, imitation is of the utmost importance, and the tendency to imitate seems to have been carefully provided for in the original endowment of the individual.

All observers agree that there is probably no imitation during the first three months of life. Some have detected what they considered to be imitation at the beginning of the fourth month, but in the case of the children the writer has observed the first clearly imitative act of which he could be sure did not appear before the seventh month. True, one may chatter to a four-months-old child, and he will respond in kind, but it seems likely that his chattering is simply one form of general motor excitement. The arms and legs, as well as the vocal organs, will be actively in motion. And then the chattering may often be heard when the child is playing with his rattle, or even lying on his back and regarding the ceiling. It is easy to be deceived respecting the child's first imitations, for when he is much stimulated and is running through the whole gamut of his motor accomplishments, as he is constantly doing the first few months, there is a good chance of some of his performances occasionally resembling those that have stimulated him, and the accidental resemblance will be taken by a novice to be purposeful.

When does imitation begin?

McDougall reports two cases of imitation during the fourth month. From his description of one case it would seem to be an instance of true imitation. It consisted in the child's protruding its tongue after seeing its father do the same with his tongue. Preyer reports that by the end of the fifteenth week he observed a case of imitation in his son Axel. When the father would purse his lips, Axel would do the same. As evidence that it was an imitative act Preyer says it was executed less perfectly than when it was done without any attempt to reproduce the copy. But while there is some doubt regarding the imitative character of the activities of a four-months-old child, there can be no question that imitation begins by the seventh or eighth month with the majority of children. By the twelfth month the child is repeating many of the activities occurring about

him. Until this period he has acted largely from within, in the sense that he has given expression mainly to his instincts; but now he begins to take account of his environment and to reflect the social phases thereof. His activities, which were originally unorganized or random, now begin to be arranged into certain systems that reproduce the types presented in his surroundings. But while the child copies the models about him, still his imitations have a certain degree of individuality. He does not hit the mark exactly in his talking, or facial expressions, or performances of any sort. Take, for example, the imitation of reading that comes in due course with most children. The imitator seizes a book when he hears someone reading, and he chatters to himself. He reproduces the simple fundamental factor, but not the special thing that characterizes this activity and differentiates it from all others.

The writer has made experiments with children up to the twelfth year in causing them to imitate arm and bodily movements, and linguistic combinations, and it has seemed that as a general principle, *they reproduce the type of performance which they have been accustomed to, but they overlook the novel particulars of the copy set them.* The younger the imitator the more certain is this to be the case. For instance, when the teacher moves his arms out horizontally with a wavelike motion, and back again in the same fashion, the children repeat the fundamental characteristics of the copy, but the arms are held straight, the wrists rigid, and the fingers tense. Even though one calls special attention to the details of the copy, the children appear to see and appreciate only what is to some extent familiar to them through their own performances. In teaching a few children between five and seven some gymnastic movements, the writer found that simply setting the copy before them was quite ineffective. He had actually to manipulate their arms and bodies in order to give

Apperception in imitation

them cues so they could execute the movements in question. Repeating this mechanical process a few times, he found he could then lead the children to attend to the details of the movements, whereas by simply looking at him they saw the general but not the particular characteristics of the copy. Their attention picked out only the familiar element in the complex whole, *the thing they had often done or the thing which seemed to them like something they had done.* This principle applies with even greater force to the imitation of speech, writing, and the like.

The principle illustrated in adult imitation

Even in the case of an adult imitating new activities, the principle here in question may be seen operating. Special features of a copy to which the imitator has not had his attention specifically drawn in the effort to *perform* them will be overlooked in his early imitations. He will reproduce, that is to say, the general character of the complex act he observes, but not the individual details of which he has not taken special account. In the game of golf, for example, the coach takes a certain characteristic position before his pupil. He grasps and swings his clubs in a special manner, but the novice does not notice the distinguishing characteristics of the "addressing" position, or the particular coördinations in "driving," or "putting," or any of the other strokes. It is probable that the novice really does not apperceive anything but the general upright position in the "addressing" position. The eye reports, "the coach stands erect," and immediately "stands erect" is translated into the habitual erect position of the novice. If the copy set before a learner be quite new, the wise coach will not depend upon observation alone, but he will actually manipulate the muscles of his pupil and so give him the *feel* of the special adjustments he is trying to establish. The pupil will be made to energize certain muscles and relax others, and the tutor will place his

hands, shoulders, and so on in the desired positions, and he will in this way mechanically aid the learner in making the right coördinations in executing his stroke.

The image of any movement which one is capable of performing may be reinstated by perceiving the movement or one resembling it in another, and then he will act somewhat like that other; that is, he will imitate him. To put it in another way, the apprehension of an activity in other persons amounts to practically the same in its motor effect as if the image of the activity had appeared spontaneously or after reflection in one's own mind. Whenever the dog barks in the child's presence, or the wind whistles through the cracks, or the kitten purrs or rolls over on the floor, or his brother or sister cries, laughs, runs or does anything else he has consciously done, he will tend to repeat the activity in what appears much like a reflex manner. This tendency decreases with age, for as the years pass one's activities become ever more completely established in definite systems. One's modes of response to stimulations, in all this implies, tend to become fixed, so that he adopts new modes with ever increasing difficulty. Images of movements not within the circle of habitual ones receive less and less attention as one approaches maturity; and in time they make little or no impression upon the system of images that have acquired the right of way. In one sense, a man's "character" means just the sum of these settled modes of action which are practically unalterable. They resist change; the man moves about among his fellows, but their personalities rarely find admission into his springs of conduct. Ordinarily a man has the manners and customs at fifty-five that he had at thirty-five; his individuality has preserved itself from modification by the other selves he has come in contact with for twenty years.

The course of development with respect to imitativeness

But things are different with the child. He has the equip-

ment needed for action, but for the most part he has no established modes of using it, so he freely patterns after the copies that are presented to him. He is plastic, as we say, or impressionable with reference to the personalities with whom he comes in contact. Of course, the young child does not reproduce all the expressions of the personalities he encounters. He takes the very simplest copies at the outset — pursing the lips as a type; then those a little more involved — bo-peep, and simple gestures, facial expressions, vocalizations and postures, for example. Then later he imitates more complex acts involved in the accomplishment of relatively simple tasks of some kind, as carpentry or farming or baking or nursing, and so on. As he grows facile in these very concrete activities he responds to ever more complicated ones in which the mental factors become more important and the motor factors are less in evidence; he plays at school, for instance, or preaching, or society formalities. He comes, last of all, in his high-school or college period, to imitate the social, political, religious, and what may be called the scientific activities going on in his environment or in the books he reads. In this last period there may still be some remains of his earlier responses; he may imitate the modes of speech and the manners of his comrades, but this activity is not so prominent as in his early days, and the traits he copies are the more subtle and less conspicuous ones which as a child he would have missed.

It remains to be pointed out that while normally children from the age of three to twenty indulge freely in imitative activity, still some are more imitative than others of the same age. The latter individuals more than the former are governed in their actions by images subjectively aroused. It is undoubtedly true that individuals differ in respect to the vividness, virility and persistence of their subjective mental life; some "live within," as we say, more than the majority of persons. So the

traits of persons among whom they live are not noted and are not imitated as in the case of those who are more outward-looking or objective in their activities. Persons of the latter type always readily adopt the manners and customs of the people among whom they live, while those of the former type retain their individual characteristics for a comparatively long time or even permanently without modification by the personalities about them.

CHAPTER IV

HIGHER FORMS OF ADAPTIVE ACTIVITY: GENERALIZATION, SYMBOLIZATION, IMAGINATION, REASON

The adaptive activities of animals

By way of illustrating the principles which it is intended to present in this chapter, a description may be given of the abilities of the so-called "educated" horse, "King Pharaoh," which the writer recently examined. It is widely believed that this horse possesses intelligence of a high order as revealed in his ability to read, to solve complicated arithmetical problems, to distinguish colors, and to remember the names and discern the character of persons. It is claimed also that he is capable of distinguishing forenoon from afternoon and of drawing subtle conclusions from concrete data, such, for instance, as determining from the aspect of a person's countenance whether the person is skeptical regarding the genuineness of the remarkable exhibition of "human intelligence" given by the horse in his public performances.

In this connection reference should be made to the reputation of the trained horses of Elberfeld, Germany, and particularly of "Clever Hans," "Muhamed" and "Zarif." Herr Karl Krall, the trainer of Muhamed and Zarif, has described in great detail the abilities of these horses in his *Denkende Tiere*. In private letters to the writer, Herr Krall has expressed his conviction that his horses possess human intelligence; and he seemingly believes that with patient and skillful teaching horses can be made to perform practically all the intellectual feats of which human beings are capable. Maurice Maeterlinck, who made a

journey to Elberfeld to observe and test Hans, Muhamed and Zarif, has reported that after subjecting them to experiments in which he thought he was able to eliminate all suggestion and deception he reached the conclusion that everything claimed for the horses by Herr Von Ostend, the trainer of Hans, and Herr Krall is true. Other observers, however, and among them the Berlin psychologist, Pfungst, have made an adverse report upon the human intelligence of the horses.

In examining King Pharaoh, the writer tested him with respect to his arithmetical ability, his power to read and to spell, his understanding of spoken language, his discrimination of colors, and his recognition and remembrance of persons. During the first test, King Pharaoh's teacher and his caretakers were present and gave directions to the horse to execute the tasks as they were set by the writer. There were thirty men and women who had been invited to observe the horse in his performances, and he gave such an apparent exhibition of intelligence that he elicited the heartiest applause from his audience. The first task set required the addition of two numbers of five digits each, the calculation of their sum involving the process of carrying. King was commanded by his trainer to study the problem and when he had fixed it in his mind to go to a trough in which a number of blocks containing figures were placed, and to push out in order the blocks containing the figures denoting the sum of the two numbers. King performed this task accurately; and in each case he indicated to the audience the number to be carried as a result of the addition of the figures of one denomination to the figures of the next higher denomination. In the same way he performed processes indicating apparently that he could subtract, multiply and divide accurately. Also, he could solve problems involving the consideration together of five or six factors. He could read sentences written on the board, such as

King Pharaoh's abilities

"King, take the yellow flag and give it to Superintendent — —." He could spell words like "Madison" and "Wisconsin." He could tell the hour of the day when looking at a watch with a clear dial face. When asked whether it was forenoon or afternoon he spelled "afternoon," which was correct.

The initial test lasted for about an hour. Then King's teacher and caretakers consented to leave the hall and permit the writer to subject the horse to another test. To make a long story very short, — the same tasks that were assigned King in the first "sitting" and which he had apparently performed accurately when Dr. Boyd was present were set him in turn again, but he was not able to perform one of them. He gave not the slightest indication that he knew even the meaning of the tests or had any conception of how to execute them. When King was vigorously urged to perform a task he would respond by pawing, but this was the only response, except a general attitude of awareness, which could be elicited from him. Throughout the second performance King appeared to be even more attentive than in the first, and he was apparently responding as intelligently as his comprehension and ability would enable him to do. So far as a horse can express his desire to comply with a command, King gave such expression. Several men in the audience who had had experience in the training of horses attempted to secure some expression from King which would show that he understood the tasks which were set him; but the only reaction that could be secured was pawing, and dodging away when he was commanded too vehemently to execute his tasks.

In the report of his examination of Clever Hans, Professor Pfungst said that apparently the responses of the horse were all in obedience to certain subtle signs or cues which were given him consciously or unconsciously by his trainer. There can be little doubt that King Pharaoh's apparent understanding of tasks and

his ability to perform them are due largely or wholly to the cues which he receives from his teacher, who declares that he does not know how King performs his tasks, and so far as the writer can tell the trainer is sincere and honest in his statement. He must, then, guide the horse unawares. During the first test he was constantly talking to King. He was in full view of King while he was performing, and he could see whether or not the horse was working accurately. He was active with hands, feet and body, as well as voice, and his intonations varied during the progress of the tests. In the circumstances it was not possible to determine whether certain intonations uniformly occurred when the horse approached a block which should be pushed out of the trough or when he was opposite a flag which he was commanded to take to a particular person in the audience. Again, it was impossible to determine whether the trainer uniformly made certain gestures or certain facial expressions or assumed certain bodily attitudes which would be cues to the horse, informing him when he should push out a block or seize a flag. Attempts have been made but without success to induce the trainer to subject the horse to further tests under controlled conditions which might make it possible to ascertain precisely what cues the trainer used consciously or unconsciously to guide King in performing the simple processes of pushing out blocks, or seizing a flag and throwing it at a particular person in a group.

It may be asserted without hesitation that when the trainer's personality is removed, King Pharaoh can perform only as a horse; he is entirely incapable of any of the special intellectual feats with which he is credited. But for the purpose of impressing certain distinctions between what may be called types of intelligence, let us suppose that King can add two numbers of five digits each, involving the factor of carrying, when his trainer is present; but when his trainer leaves

Types of intelligence

him he cannot perform the task. Then his intellectual processes must depend upon sensory stimulation of a very definite character. If he can build up the concept that seven and eight added together make fifteen, one of the factors entering into the concept must be the trainer's individuality, and when this factor is absent the concept cannot function. In other words, the concept of numerical relation can have no independence as a concept if it cannot be reinstated except when the factor of the teacher's personality sets it up, so to speak; and since the teacher's personality is no part of a true concept of numerical relations, King cannot be said to form a concept at all. A child who could not add seven and eight except when the person who taught him was present would not be considered as knowing how much seven and eight taken together amounted to. He would simply have formed a specific response in a specific situation, and when the situation is modified in any way the response is impossible. The response, though, should not — and with a normal child it would not — depend upon any special circumstance.

This will be as good a place as any for the writer to express his opinion to the effect that it is impossible for King Pharaoh or any other horse to establish the concept that seven and eight make fifteen. There is no reliable evidence on record indicating that a horse can make the integration necessary to derive the idea of a group of fifteen objects from the addition of groups of seven and of eight objects. There is no evidence, either, that a horse can establish an association between the symbols *7* and *8* and *15* so that seeing *7* and *8* in a certain relation the symbol *15* appears. But assume that King Pharaoh is capable of performing such a process; he is capable of it only under very specific conditions, — namely, when his trainer's personality is the essential factor in the situation.

Even if this first step in finding the sum of the two numbers

could be performed by the horse, it is beyond belief that he could take the next step, which involved not only the addition of the numbers six and seven but involved also the abstraction of one ten which was acquired from the addition of the units, and its annexation to the order of tens. The number of factors necessary to be kept in mind and related to one another in performing this task, which is not a part of a horse's instinctive equipment, is beyond the capacity of any horse so far as reliable observations or tests have shown. If a horse could execute adaptive activities of which the above is an illustration he would cease to be a horse. If the ancestors of King Pharaoh had been capable of original activities of this degree of complexity, King Pharaoh would not have been traveling through the country giving exhibitions for the financial benefit of his master, with the prospect simply of receiving an apple or a piece of sugar at intervals during his performance. A horse is and must continue to remain a horse because his range of adaptive activities limits him to specific responses to stimuli along the lines of the responses which his ancestors for ages have made. When he sees a paper blowing along the street or catches an odor of a bear he will flee for safety. When he sees corn, on the other side of a low fence, he will jump to get it, even though the farmer has put up signs forbidding horses to eat his corn and even though the horse will be made sick by his indulgence; and so on *ad libitum*. The horse's mind is not constructed so that hereditary response can be modified in any important or fundamental way by a consideration of circumstances which should modify it, but which could not be or at least were not taken account of by his ancestors. In sum, the horse's intelligence is almost entirely of the sensori-motor character, — stimulation and habitual reaction without modification or control by significant and vital factors which did not enter into the establishment of the original reaction.

Sensori-motor response

King's ancestors were very sensitive to certain kinds of sights, sounds and odors. If they had not been they would not have been able to evade their enemies, and the race of horses would have been eliminated. This sensitiveness was transmitted as an inheritance to King. He, too, is exceedingly sensitive to sights, sounds and odors that once had connection with the welfare of horses. In giving King his lessons his teacher had connected certain responses with the securing of sweets or avoiding a whipping. The cues to these responses were slight movements of hand or foot or head, facial expressions, posture, modification in the volume of voice, intonation or possibly a combination of all these. King is keener in noting these cues than his observers, though they could perhaps be trained to be as sensitive as he is. But on the occasion of the experiment referred to above, the observers were guided by the verbal commands, oral or written, which were given King, and they were not sensitive to any other cues; it was not necessary that they should have taken account of anything but these verbal commands. King worked from visual or auditory cues to certain responses which had been repeatedly forced upon him through reward or punishment. Deaf and dumb persons are much keener in noting distinctions in the movements of lips and vocal organs in speech than are normal persons, simply because they must depend wholly upon these cues in interpreting what a speaker means. This principle will account for King's extraordinary keenness in noting inconspicuous bodily movements or attitudes, facial expressions or intonations which were missed by most of his observers.

A horse's responses depend upon visual, auditory or olfactory cues

We now have access to a considerable amount of careful experimentation on the behavior of animals from the simplest protozoa to the highest mammals, including Witmer's chimpanzee, "Peter, the monkey with a mind." Any person

who will without preconception review the available data regarding animal intelligence secured as a result of this experimentation cannot fail to reach the conclusion that animals of every species are determined in their responses, absolutely among the lower animals, including the ants and bees, celebrated for their intelligence, and very largely among the higher animals, by visual, auditory, tactile and olfactory stimulations directly connected with their mode of life as governed by their heredity and habitat. Holmes was able to cause a crustacean to behave in a manner adapted to secure food from him whenever he came into the room in which the creature was fed; it was able to connect stimuli derived from the feeder's presence with the gaining of food so that in time the stimuli would release the actions in anticipation which in the past were set up only when the creature was actually realizing sensations from the food. Lloyd Morgan, Lubbock, the Peckhams, Fabre, Mills, Washburn, Bateson, Jennings, Watson, Thorndike and others who have observed the adaptive activities of animals and who have subjected them to tests to determine in how far they could modify their habitual responses in order to adjust themselves to modified situations have cited a great number of instances showing the capacity of animals of low and of high degree to react with varying acuteness to cues when these have been directly connected with the gaining of food or avoidance of pain or the protection of the young; but the responses of all animals are closely and as a rule entirely dependent upon sensory stimuli which through trial and error or training have become connected with the hereditary adaptations of the animals, — the adaptations which were essential to the preservation of the species.

The quality of animal intelligence

Undoubtedly some of those who read these lines will recall many instances of animal activities which apparently indicated a higher type of intelligent response than has been accredited

them above. Popular literature contains innumerable anecdotes concerning the cunning, the acumen, the sagacity, the sound judgment and the reasoning powers of animals. The writer has been favored with many tales of this kind. He has asked a number of classes of university students to give descriptions of instances of remarkable animal intelligence which they had observed. In this way he has accumulated hundreds of accounts of the sagacity of dogs, for example. One instance is typical of others; a graduate student in a university writes: "When I was on the farm we had a collie dog which could be relied upon to do whatever he was told to do. When Mother would ask him to go to the barn and tell the men to come in to supper he would hurry off, find us men in the barn or wherever we were and show us plainly enough that we were wanted for supper. When it was time to get the cows, I would say to him: 'We ought to have the cows now. You go and bring them in,' and he would trot off, round them up and bring them into the yard. He liked to go with us to town. Sometimes we would say to him: 'You can't go with us to-day. You must stay at home.' He would turn about and go despondently into the house and stay there. In a great many other ways he indicated that he could understand what we said to him and was able to think through difficult situations."

Popular misconceptions regarding the abilities of animals

When the writer of this description was questioned regarding all the details involved in giving commands to the dog, it was apparent that the principal cues which guided the animal were not taken account of by the observer. When the woman in the house told the dog to go and bring the men to supper the writer of the note did not know whether she always opened the door and pointed the way to the barn. He did not know precisely what she said, — whether it was "Run and find Father and the boys and tell them supper is ready," or whether she mentioned the names of the boys or whether she simply said

"Supper." And then when the dog told the men to come to supper, the one who reported the dog's actions did not know exactly what the dog did, — whether he ran to each one and then turned about and ran toward the house, or whether he barked in a peculiar way, as much as to say "Supper is ready; come with me," or whether he wagged his tail, or what he did. When asked how he knew that the dog was trying to tell him that supper was ready the observer was confused. It was apparent that the dog did not behave differently when he went to tell the men supper was ready from the way he did on a great number of other occasions, but the men knew it was supper time; they knew that the woman in the house had signaled to the dog before supper time to run to the barn. They were looking for a summons to supper and it was signal enough when the dog came running toward them. It was not necessary that he should have had anything whatever in his mind about supper, or that he should have had any different expression from the one he had on any other occasion in order that the men would know they were wanted in the house. The observer who reported the incident neglected the really essential factors in his report of the dog's performance; he was disposed to think that the dog had intelligence and he ascribed to the dog's actions vastly more of purpose and understanding than there probably was in them.

Again, when the observer was asked just what he did and what he said to his dog when he was commanded to bring in the cows, it was apparent again that he had neglected most of the vital factors in the situation. It developed that usually, at any rate, he would open the gate leading from the field into the cow yard. Then he would call to the dog; he did not know whether or not there was a peculiar intonation in his voice when he called. But this would not be necessary; the mere act of opening the gate was the dog's cue. The man might have said, — "I don't want

you to bring in the cows now" — and it is probable that the dog would have gone off in precisely the same way as if he had said: "It is time to bring in the cows now." The words used by the observer played at best only a very slight rôle and probably played no rôle at all in leading the dog to bring in the cows.

Illustrations of a dog's intelligence

The writer had been able for several years to observe the activities of a pure-bred collie dog, "Muffin." One would frequently hear people say of her, — "She is as intelligent as a human being." But without exception her behavior was always determined by visual, auditory or olfactory cues. Muffin would play rather intricate games with children and adults, but these games all depended so far as she was concerned upon definite sensory stimuli to which she would respond in definite ways. For example, she was taught to play "hide and seek." First she would run with a boy across the lawn and hide behind a tree or behind a house at the end of the lawn, or they would together run down the bank at the bottom of the lawn and hide somewhere along the shore of the lake. After a time, whenever the game was begun, a boy would stand up by the tree that was used for the station, put his hands to his eyes and begin counting, and Muffin would run off without being accompanied by anyone. She would go behind one of the trees or the house or run down to the shore as she had done originally when she was being taught. Then when the boy whom Muffin had seen stand by the tree sounded his warning to all hiders, Muffin would come dashing to the station. Observers who noted this performance thought she revealed as much intelligence as any of the other performers. But as a matter of fact, she did only what she had done before when the conditions were practically identical. She never could learn to remain hidden in her secret place until she stood a good chance of making the goal before the keeper of the station. The keeper would often favor her because she was a dog and would

run so slowly to his goal that Muffin would get ahead of him. Muffin never learned to search out new hiding places which would afford greater protection than any of the places to which

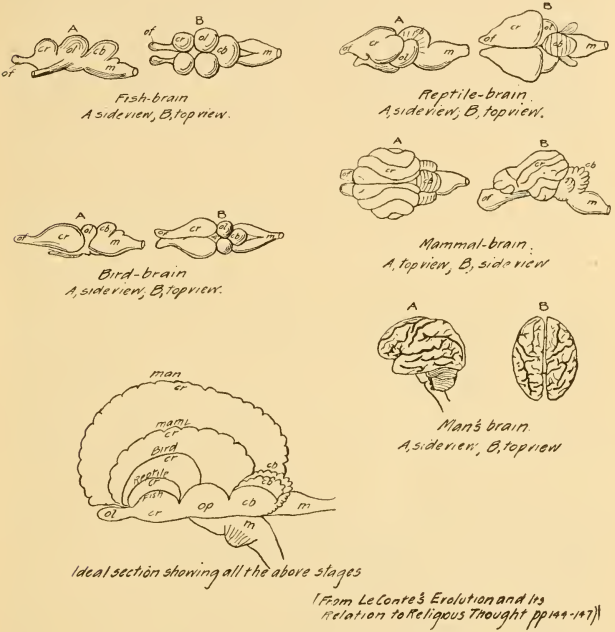

FIG. 6. — A general view of the brain of animals as compared with that of man. (See exercise 13, page 314.)

she had gone with her trainer. She did not try to pursue new and devious methods of approach to the station so as to throw the keeper off the track. In brief, she did what she had previously done with one who had human intelligence, but she

could not construct and use the concept of hiding in a safe place and making her approach to the goal in the most protected and least conspicuous way. She could perform the specific acts which she had performed, but she could not apply the principle involved so as to develop new and improved performances.

This instance is typical of all that Muffin could do. About the house she was very sensitive to what was said to her. But those who spoke to her when she responded intelligently always used simple words and they were limited in suggestion to definite responses related to food, to leaving the house, to lying down, to jumping or barking and the like. Even when these words were used they were accompanied by appropriate gestures, attitudes or intonations. When it was desired that Muffin should jump a pole or chair or other object put before her, as a cue she would be invited by an appropriate gesture of the hand to make the jump. The one giving her directions would sometime uses complex sentences as "Muffin, you must jump as high as you can now," and then when she would jump high the observers would be apt to say: "Isn't it remarkable how she understands what is said to her?" But it was a simple matter to note that she got her cue from the position of the hands or the pole over which she was to jump, and the likelihood is that she did not understand a single word said to her, unless the word "jump" might have suggested a definite response.

A large portion of Muffin's responses that seemed intelligent were reactions simply to opening the doors of the house or the door of the automobile, or putting on wraps to go out, or facial expressions indicating pleasure and desire to have sport with her, or the opposite type of expression of displeasure accompanied always by harsh, condemning tones. In practically all these instances language would be used and the observers would think that Muffin was responding to the language, when as a matter of fact the language as such — divorced from facial expression,

gesticulation and bodily attitude — was playing no rôle whatever in Muffin's reactions.

In order further to emphasize the difference between the animal type of adaptive activity and the distinctly human type, suppose we subject a child to the tests which were given to King Pharaoh as described in preceding paragraphs. At the time the writer tested King he was nine years of age. Ask a nine-year-old child to add the two numbers which King failed to add except in response to cues given by his trainer. The child's first act would differentiate his intellectual ability sharply from King's. When he looked upon the figures *7* and *8* in the relation of addition, the figure *15* would appear in consciousness. If King could find the sum of seven and eight at all, he would have to image a group of seven objects and a group of eight objects and then image the result of putting them together; that is to say, he would have to image groups of seven, of eight and then of fifteen. If King could perform even this concrete process he would have gained a mastery over his environment by combining and adjusting forces which would have made him less the creature of circumstances and conditions than he actually is. But for the sake of illustrating the principle which must be brought out here, let it be supposed that King could image the concrete situation in adding seven and eight and deriving fifteen. He could not perform the symbolic process of associating the figures *7* and *8* and derive the figure *15* and then interpret what these figures meant. Apparently no provision has been made in the animal mind for using symbols for content and utilizing these symbols in place of the realities which they denote, associating them and operating upon them as the contents which they symbolize might be associated and operated upon.

One trait of distinctly human intelligence, — symbolization

It will readily be granted, no doubt, that one could hardly overemphasize the importance of symbolization for increasing

the range of adaptation. The child who cannot learn to understand or use language or figures cannot achieve a much higher degree of adaptation than the dog or the horse or any other animal that is incapable of understanding and using symbols, language particularly. Why does language play so important a rôle in adaptive activities? First, because it makes it possible for the individual to condense his experience and react to a simple sign which carries the meaning of the experience. To illustrate the point; take a sentence which the writer has just heard addressed to a nine-year-old child. "Father is going to bring out the auto; if you will finish your lessons quickly you may ride out to the farm and you can drive the horses while they are loading hay." Instantly the boy applies himself to his task. In four seconds he grasped the significance of a vast amount of extremely complicated experience. If he was compelled, in order to determine what should be done in the present situation, to run through all the concrete experiences involved in the father's bringing out the automobile and driving through the city and the country and reaching the farm and all the details related to horses and hay, wagons and driving, it would have taken him about as long to review the experiences as it did to acquire them. The relation of his performance of the task before him to the involved process of going to the farm and driving the hay wagon is instantly felt with sufficient definiteness to determine his action.

Importance of symbolization in adaptive activity

By the use of language the individual can make responses without being actually in the situations to which the responses relate. He can pre-adapt himself to situations; he can profit by the adaptations of his fellows. He can take an attitude, for instance, toward situations in California though he is living in Wisconsin; he can determine from the language used by others whether he should go to California to live or whether he should invest there and so on. One who can understand and

use language can take advantage of the adaptations made by his ancestors. Plato exerts a strong influence upon the behavior of many individuals in these times; his counsel plays as important a rôle in the life of some persons to-day as does the counsel of their nearest neighbors or anyone else now living. Thus the individual is the heir of all the ages and he lives in all climes and places, because by means of symbols which denote experience he can shape his behavior in view of all that men have discovered in the art of living in the past or are discovering anywhere in the world at present.

What is true of language is true in a measure of other forms of symbolization, figures especially. The intellectual process involved in using words for the content of experience is the same in principle, though it differs in degree of complexity, as in using figures. A properly taught person who glances at *7* and *8* and derives *15* feels what these symbols mean, though he does not focalize the concrete details which are denoted by them. When such an one performs processes with figurative symbols which denote complicated realities, as the amassing of millions of dollars or objects of any kind or the computation of the force exerted by various agencies, — the winds, electrical power, gases, and so on *ad libitum*, — he feels the significance of every process and he knows the meaning of his conclusions, but he is not required to image the realities with which he deals. It is enough for the purposes of adaptation that he should feel the meaning of the results. So again, in higher mathematics, as in algebra, geometry and trigonometry, the individual makes use of symbolic processes which enable him to determine the proper response to be made to a situation, whereas it would be practically and often absolutely impossible for him to decide what should be done in the situation if he did not possess these means of generalizing experience and using symbols to denote it, and the consequences of readjusting quantitative relations and manipu-

lating forces. These symbols can be combined and the effects traced exactly as could be the quantities themselves which they denote. Thus through the use of symbols the individual can trace the relations of objects and forces and the outcome of combining them or operating upon them in any way when he could not do so if he had to deal directly with the realities. So one who is capable of generalizing experience and denoting it by symbols and then operating with the symbols can adapt himself in a well-nigh infinitely higher degree to the world in which he lives than one who is incapable of such generalization and symbolization by means of words or figures or designs of a similar character.

Development of symbolizing activities in the child

A three-months-old child can neither understand language nor use it to express experience. He cannot understand or employ figures to denote quantities or their relations. Toward the end of the first year he begins dimly to understand a few words that relate very directly to objects with which he comes in vital contact in his daily life, and activities connected with the gaining of food or pleasure, or the avoidance of pain. At the end of the ninth month he is about on a par, roughly speaking, with a collie dog in regard to the understanding of language. He acts in response to cues as the dog does, principally cues derived from gesture, intonation and the like. And he expresses himself principally through intonation, gesticulation and so on. By the eighteenth month he normally employs words to denote concrete experience; but he uses only single words and these are as a rule mutilated. He cannot connect two words together in a sentence; he does not appear to distinguish objects from their actions or their qualities or their special relations. At this age he conceives situations and reacts upon them as wholes. When he sees his dog jump over a chair he calls out in his baby talk, "Doggie!" and possibly though not probably, — "Jump!" He does not

and probably cannot conceive the dog as an object apart from his jumping or barking and the like. When the child is eighteen months old the word "dog" in his speech does not perform nominal function, strictly speaking, because the object is not felt as a thing apart from its actions or aspects. But as he develops, the idea of the dog as an entity will gradually acquire independence of any particular aspect or activity or relation of the dog; and he can detach the idea from any particular activity, relation or quality. Thus, speaking grammatically, the word "dog" comes in due course to perform nominal function independent of verbal or qualitative function. What is true regarding the development of the word "dog" as a symbol of experience is equally true of every word which denotes an object of any kind. It is true in principle also of any word which denotes an action, a quality or a relation.

The ability of the individual to develop free ideas

It can be seen, then, how far the twenty-year-old individual has gone beyond the collie dog, whose intellectual processes are confined very closely if not absolutely to the situations in which the processes were established. One may not dogmatize, of course, upon what passes in the mind of a collie dog, but so far as can be told from its behavior, it cannot generalize its experiences into concepts and give these concepts freedom to play a rôle in any situations not exactly like those in which the concept was developed. One reason the collie remains a dog is because it cannot, unless in a very imperfect manner, generalize its experience with objects and detach the generalizations from the particular situations in which the objects were responded to, and so it cannot react to objects except in the manner in which they have already been reacted to, except as it may by chance develop a new adaptation. But because of the ability which the twenty-year-old human being possesses to detach generalizations from the particular situations in which he is placed at

the moment, he can preadjust himself to situations, he can construct new situations in consciousness, and in imagination he can react upon them and note what happens. So he can determine how he should act before he actually does act and thus he can save himself from much blundering.

The ability to foresee consequences and adapt means to ends

The capacity to foresee the consequences of responses gives a human being incalculable advantage over the creatures that cannot see beyond the particular experiences which they have had. To cite one instance of the capacity to foresee consequences, mention may be made of what is taking place in Paris at the time of this writing. The President of the United States is in Paris attending the Peace Conference. He is helping to decide what penalties should be imposed upon Germany and what relations should be established between Germany and the other nations of the world. He has in view the welfare of America as well as other nations a hundred and even a thousand years from now. He is not acting with regard to the welfare of America this year; this would be of slight importance. The welfare of the nation in the future is the vital matter. When any measure is being considered, President Wilson's mind can construct the situations which will arise in the future if the measure should be put into effect. He can foresee the responses of the people for a thousand years to this measure and so he can determine whether the welfare of the country would or would not be promoted by it. Thus while he is a thousand years removed from those who will be affected by his decisions, he can nevertheless determine what attitude he should assume toward every measure proposed.

In order that the significance of this capacity may be impressed, let it be supposed that King Pharaoh were attending the Peace Conference and he were asked to consider whether a proposal should or should not be accepted. What would take

place in his consciousness? An immediate response determined by the outcome of an experience in the past with an identical measure. If it varied slightly from proposals with which he had had experience he would act as he had in the past without being able to distinguish the variations which should modify his conduct. But the chief distinction between his action and the action of the President of the United States would be King Pharaoh's incapacity to conceive of the consequences of the proposed measure because he could not image the consequences. He could not picture to himself what would happen in America a thousand years from now if certain proposals were accepted, since he could not form generalizations or principles which he could apply in situations in which the conditions are somewhat different from those in which his experiences occurred. A creature cannot foresee consequences if it cannot generalize present experiences and detach the generalizations from the situations in which they were gained.

Free concepts must be controlled by the ends to be attained

It is, of course, essential when generalizations or concepts are freed from the particular situations in which they were experienced that they be held in control by the ends which the individual has in view. President Wilson, to illustrate, can marshal all his concepts of the life of a nation under varying conditions so that they will be brought to bear upon the particular subjects which he is considering. Shall the Monroe Doctrine be retained? The Monroe Doctrine involves a large number of conceptions pertaining to the relations of nations and their well-being. The conditions in the world will be changed by the League of Nations, if adopted. Does the welfare of the American people require that under the new conditions in the world the Monroe Doctrine should be upheld? President Wilson, in answering this question, must be able to command all his concepts and make them play a rôle in relation to the definite problem he is trying to

solve. He has his ends to attain and he must be able to bring his concepts into any pattern he wishes in order to throw light upon his problem. They must be responsive to his needs, that is to say; they must be mobile and plastic, but they must not be lawless or chaotic or ungovernable. If they do become headstrong or ungovernable the individual will, of course, be alienated from his environment. It sometimes happens under conditions of intoxication or mental disease that one's generalizations cease to be law-abiding, which means that they do not conform to the constitution of the world of realities to which they relate. They cannot be utilized with reference to ends to be attained and so they do not serve the purpose of enabling the individual to foresee the consequences of his actions and govern them accordingly. Freedom, plasticity, mobility of ideas under the control of law and order and exercised always with reference to ends to be attained are the essential requisites for efficiency in adaptation, and this is the situation which develops gradually in all normal human minds under usual conditions.

The principle to be impressed here is that the most important distinction between the primitive and the higher types of intelligence lies in the possibility of the latter generalizing experience and then freely using the generalizations in new situations in order to accomplish desirable ends. To illustrate the principle with an instance: A horse was fed corn on the ear in its manger. An ear fell on the stable floor, which was covered with straw. The horse attempted to eat the corn where the ear fell and of course lost much of it. If the horse possessed the faculty of generalizing experience it would have taken the ear in its mouth, put it in the manger, and eaten it there where not a kernel would have been lost. If a four-year-old child were placed in a similar situation he would have been able to utilize generalizations of his past experience and he would

The most important distinction between the primitive and higher types of intelligence

have seen that he would be better off if he would place his food where none of it would be lost. This simple instance illustrates why it is impossible for the horse or any other species of animal below man to progress in its development beyond the specific adjustments it has actually been taught or has discovered by the method of trial-and-success, whereas the normal human being by the age of two and increasingly thereafter uses what he has been taught or what he has discovered by the method of trial-and-success to secure adjustment to situations with which he has had no trial-and-success experience and concerning which he has not been taught.

Another illustration will impress the distinction in question here. In the examination of King Pharaoh, already referred to, this problem was set: "King, suppose you pay five cents for fifteen apples, how much would you have to pay for eight apples?" Under the guidance of his trainer King performed the processes accurately, but when his trainer was gone he did not show the slightest comprehension of the problem. It is inconceivable that he could apply the general principles involved to the particular quantities and relations presented in this problem. A normal ten-year-old child could readily image the quantities and relations, even though he had never encountered this specific problem before. But he had dealt with situations involving the principles of relation which were presented in this problem, and he could detach these principles from the particular instances from which they were derived and apply them to the new situation.

Finally, in order to stress another of the characteristics of human intelligence, suppose King had been asked to prove that the sum of the interior angles of a triangle were equal to two right angles. Even Maurice Maeterlinck would probably agree that the most highly educated horse could not solve this problem. And why? First, because

Analysis and synthesis

he would react to the situation as a whole, if he reacted at all, which is very unlikely. If he had been taught when geometric figures were placed on the board to paw or to respond in some other way, he would respond in that way; he would not analyze the particular problem placed before him and note what should be done with respect to each element thereof. Even if he could have performed this analytic process he could not have taken the next step in integrating or synthesizing the elementary responses appropriate to each element. He does a few things in a relatively simple environment, so for him it has been sufficient that, given a situation, he should immediately respond to it as a whole. His mind has not been fashioned so that it can differentiate factors, note the meaning of each and then integrate all the factors in a situation so as to be governed by their significance when operating together. But this is precisely the characteristic of the normal human mind, which begins to be manifested in a simple way by the second year; and the ability and the activity continually increase to full maturity.

CHAPTER V

EXPRESSIONAL ACTIVITIES: VOCAL, FEATURAL, POSTURAL, GESTURAL

DURING the first days of life the child's only vocal expression is a squall. This is accompanied usually by contortion of the features, the mouth especially, and agitation of the arms and the legs. His caretakers interpret these expressions to denote that he is experiencing discomfort of some sort, — either hunger or cold or colicky pains or too tight clothing; but they cannot tell precisely what is the source of his trouble. Even the mother, whose attention to the child's expressions is especially keen, cannot tell from any one or all of his expressions what is the cause of his distress. If he is crying and he has recently taken food, the caretakers conclude that his rations have not agreed with him, and so on; but they examine one thing after another to see if they can discover what is disturbing him. They do not have to proceed so blindly by the time the child is six months of age, for when he cries then it is possible to locate pretty definitely the cause of his disquietude. The mother can tell from the peculiar quality of the vocal timbre of the cry whether the child needs food or desires her companionship or has been frightened, or is suffering from cold or internal or external pain. She can tell when he has been made angry by a brother or sister or when his caretaker has taken his food away from him before he is satiated. That is, the original squall, expressive of discomfort but without indicating the particular cause thereof, becomes differentiated by the sixth month so that each variety of distress is revealed in characteristic vocal timbre.

Indefiniteness of the first efforts at expression

As the child develops, his relations to the world about him and especially the world of persons become very complex. His original discomfort becomes differentiated into many varieties of discomfort, pain and distress. The joy which he experiences in his third or fourth month becomes enriched according to the extent of his relations with his physical and his social environments. How does he acquire the elaborate and complicated machinery necessary to express adequately his differentiated feelings and attitudes? Fortunately he does not have to learn all the technique of expression required to portray these feelings and attitudes. He comes among us equipped with ready-made means of revealing all his fundamental experiences. The moment he feels joy, for instance, the mechanism needed to express it is prepared to function. So when he first experiences anger he can reveal it adequately though he has never seen an angry person, and of course has never taken lessons relating to ways and means of expressing anger. Nature has given him mobile features and a mobile body and particularly a responsive vocal system, which have all been tuned for him so that he can express his fundamental feelings. On account of this responsiveness of his vocal, featural and bodily members, he has a tremendous advantage over any other creature in his facilities for revealing his experiences.

Ready-made means of expression

It is doubtless appreciated by everyone that the child's voice, face and arms and hands are much more mobile than those of any of the animals, and so he can reveal a much larger range and variety of experiences than can the dog, the monkey or any of the lower creatures. One can tell from a dog's bark whether he is frightened, or is lonely at night, or is angry at a human being or at another dog, or has been injured, or is suffering from hunger, or desires to accompany his master on his journeys, or wishes to be let into his house or let out of it, or is

joyful upon the return of his master or is grieving for the loss of him. But this is about as far as he can go in divulging his feelings and his attitudes through vocal expression, — or any other mode of expression for that matter. If a dog feels admiration or regard or contempt or disgust or envy or jealousy and the like for either his dog or his human associates it is impossible to detect his feeling in his expression. But a practiced ear can readily detect any or all of these evaluations and attitudes and many others in the vocal responses of a typical ten-year-old child; and he can detect them more clearly still in the vocal expressions of an adolescent or a mature person.

Darwin's view of the origin of expression

Darwin's view is still held by many persons, — that all the child's modes of expression are the remains of activities which once were practiced by man or the animals in self-defense. In the expression of anger, for instance, the fist is clenched, the teeth are bared and set, the brow is knit, and the entire organism assumes an attitude favoring the concentration of all the individual's energy of resistance against or aggression upon the object which has aroused the anger. This emotion is awakened in the child only when he is thwarted in attaining what he desires, or when his pleasures have been interfered with or pain has been inflicted upon him. The function of anger in self-preservation is to remove or destroy the object which has interrupted the individual's enjoyment or which has threatened his well-being. The various members of the organism — teeth, nails, fists, for instance — which can be used to do violence to the enemy are brought into positions in which they can be used to greatest advantage. But in the evolution of the human species this type of physical reaction upon offenders has been increasingly restrained until now it has largely disappeared, at least in adult life.

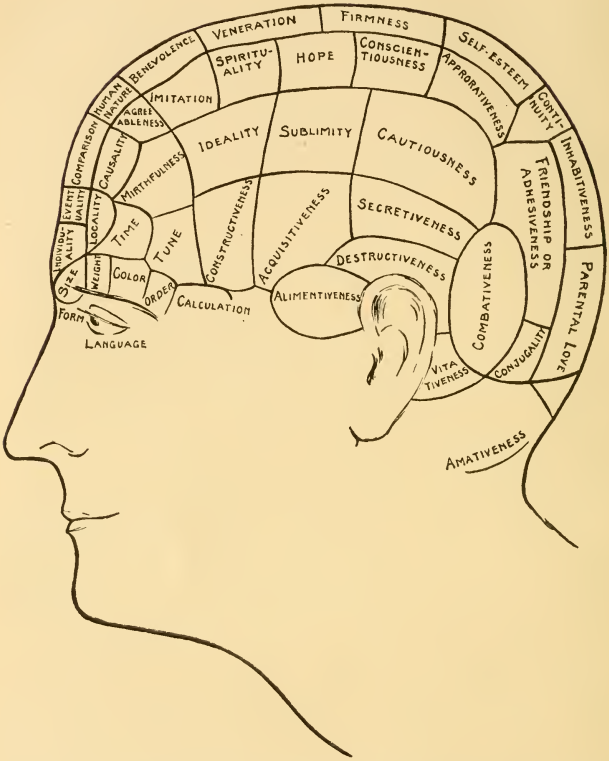

FIG. 7. — A great many persons believe that it is possible to make out one's character by examining the elevations and depressions of the skull. The phrenologists base their theories upon the doctrine that each mental faculty is located in a certain portion of the brain as shown in this chart. (See exercise 14, page 324.)

One cannot detect the expression of a complex emotion like contempt, scorn, disgust or admiration much before the age of ten. It is probable that the motor accompaniments of these emotions grow out of reactions to taste and smell experiences. An object of disagreeable taste which gets into the mouth will arouse ejective responses, and the reactions of all the mechanisms concerned will be such as are necessary to spit out the offending object. Often the eyes are closed as though shutting out the sight of the disagreeable thing. Also, in reacting upon an object that is offensive to smell, the child automatically withdraws the head, closes or reduces the openings to the nostrils and expires. These reactions occur as early as the twelfth month, but they increase in frequency and intensity up to the teens. These responses to offensive tastes and smells serve as the basis for the motor reactions in disgust, repugnance, contempt and all abhorrent attitudes toward persons. The expression for contempt, scorn and disdain is not so much of the nature of ejecting or removing the disagreeable person as of avoiding him or letting him alone. Disgust produces a more positive and dynamic reaction; an individual is more likely to assume an aggressive attitude when he feels disgust than when he feels contempt or scorn or disdain for an individual. A person who awakens disgust may actually be offensive to the senses of the one who is reacting against him; but a person who arouses contempt is apt to be offensive to the intellect or the moral sense, and so the expression is more reserved in the case of the latter than of the former.

The expression of complex emotions

Contrasted with taste and smell experiences which are disagreeable are those which are agreeable. In response to sweet tastes the motor reactions of the mouth especially are such as are necessary to secure and retain the object which affords the pleasurable sensations. In the reactions upon pleasant odors

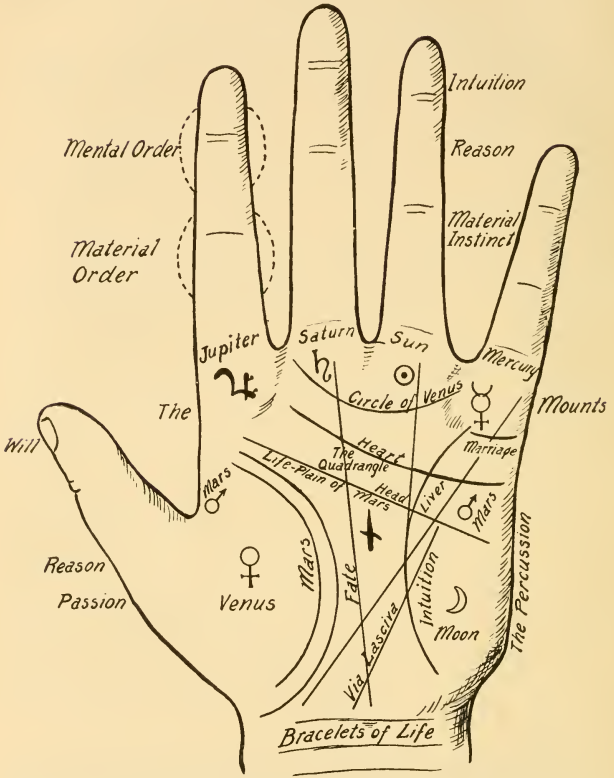

FIG. 8. — Some people believe it is possible to "read one's character" by examining the various "mounts" and lines of the hand and the relative lengths and thicknesses of the joints of the fingers. (See exercise 15, page 324.)

and fragrances the individual tries to bring the olfactory organ close to the object yielding the odors. In the course of development one sees the expression of emotions of approval which are derived from the expression for agreeable tastes and smells. The expressions of affection — feelings denoted by sweet, lovely, delightful and so on — have reference to taste and odor experiences. The expression of admiration is less dynamic than the expression of affection. But the attitude of the individual in both cases is positive; he would like to secure and enjoy the person who arouses his affection and admiration.

There are a few complex emotional attitudes which appear in the course of development the expression for which cannot be traced to the motor reactions to tastes and smells. Take for illustration such an emotion as pride and its contrasting emotion, humiliation. In the expression of pride the eyes and head are inclined upward, and indeed the whole body appears to be extended upward, while in humiliation just the opposite attitude is assumed. The expression of pride is seen earlier by several years than the expression of humiliation, and it seems to arise from the child's response to the physical objects with which he comes in contact. The young child is indifferent to the effect of soil upon his person; he has no aversion to dirt; but somewhere between his eighth and his twelfth birthday he begins to show an abhorrence of dirt. As the emotion of abhorrence becomes strengthened, the individual seems to lift his bodily members up from the dirt, and upon this reaction is developed the general expression of pride. It is at first an attitude of rising above soil and dirt, and in due course the individual feels he has risen above his fellows in intelligence, in looks, in clothes, in material possessions and so on. Whatever the individual feels he possesses in superior measure to his fellows he automatically manifests by appearing to have a position above them so that he is looking down on them.

It is the aim in this chapter to deal mainly with the motor accompaniments of emotion; but to reënforce the view that the purpose of all motor reaction to an emotion is to enable the individual to adjust himself advantageously to the situations arousing the emotion, it may be pointed out that the physiological concomitants of emotion apparently serve to enable the organism to utilize its energies to the fullest extent in supporting the motor reaction. It is doubtless familiar to every reader that strong emotion, especially fear or anger, profoundly affects vital function. For instance, fright delays the digestion of a meal; and one who is looking forward to a terrifying experience "loses his appetite." So anger arrests digestion and exerts other marked organic effects. On the other hand, joy and especially the anticipation of tasty food increase the activity of the entire alimentary system, — the secretory, motile and assimilative processes. Recent investigation, especially by Cannon and Pawlow, has extended our knowledge of these physiological effects of emotion. In fear and anger especially, the blood is withdrawn from the alimentary tract, and the processes of digestion and assimilation are temporarily checked. The blood is sent in comparatively large volume to the heart, the muscles and the brain, and it is prepared so that it will clot quickly if the organism is wounded. Respiration and heart action are quickened. At times the perspiratory glands become active and sweat is poured out on the skin. The liver discharges relatively large quantities of sugar into the blood stream. It has been shown that these effects are produced largely by the action of the adrenal glands which under stimulation of the emotions of fear and anger discharge adrenalin into the arteries. This serves to check certain organic processes which are not necessary and stimulate others which are needed for self-defense or for aggression. The point is that the effect of the adrenalin is to prepare the

Organic accompaniments of emotion reënforce motor reactions

organism to carry out effectively the motor reactions which are automatically set a-going by the emotions, and the purpose of

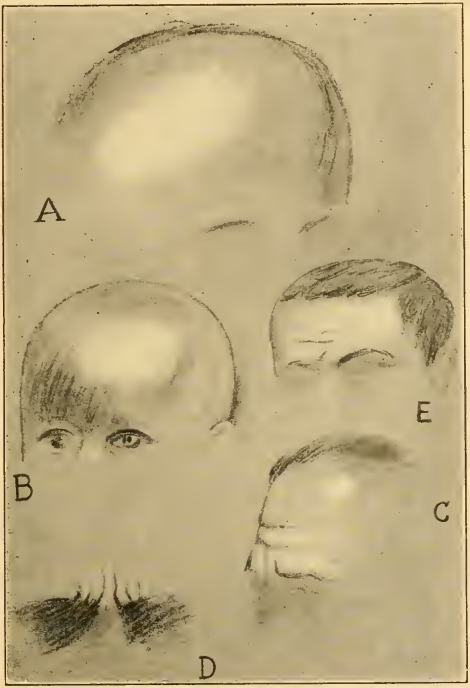

FIG. 9. — Studies in the expression of the brow. (See exercise 18, page 324.)

which is to protect the organism by flight or combat from impending danger.

While the phraseology used above might suggest to some readers that motor responses are the effect of emotions, it is not

the intention to take a stand on the question as to whether emotions are the causes, the effects or but aspects of motor reactions. As the James-Lange theory is ordinarily interpreted, it maintains that emotions are the product of motor actions and bodily attitudes; if one did not assume the attitude of fear, for example, he would not feel the emotion of fear. For our purpose it really makes no difference which is cause and which is effect, or whether the emotion and the motor accompaniment are phases of a unitary process. We are concerned solely with motor reaction as a revelation of emotional states, and even though an emotion should be but the effect of motor reaction, nevertheless the individual experiences the emotion and he seeks to adjust himself appropriately to the situation in view of which the emotion has been stimulated.

The James-Lange theory

To return to the development of expressional activities in the child, it may be noted that when a seven- or eight-months-old child is made angry his body becomes rigid, his fists clenched, his lips are drawn apart, the jaws are set, the brow is corrugated, there are deep furrows in the cheeks, the muscles about the eyes become tense; in short, the entire muscular mechanism becomes taut so that all the energies may be concentrated upon the offender. Any emotion, experienced by a child, takes full possession of the expressive mechanism by which it is revealed, but it quickly passes. With the approach of puberty the intensity of expression begins to decrease and it continues normally to decrease until full maturity is reached, but the duration of any expression is increased. When a five-year-old boy learns that he can go to the circus, every mobile part of his organism gives expression to his joy. He jumps up and down, waves his arms in the air, claps his hands, gives way to hilarious vocalization, and all the features are swept by expressive movements. In

With the child expression is intense but of short duration

a comparatively short time, however, these expressions subside and others take their place; the child slips rapidly from

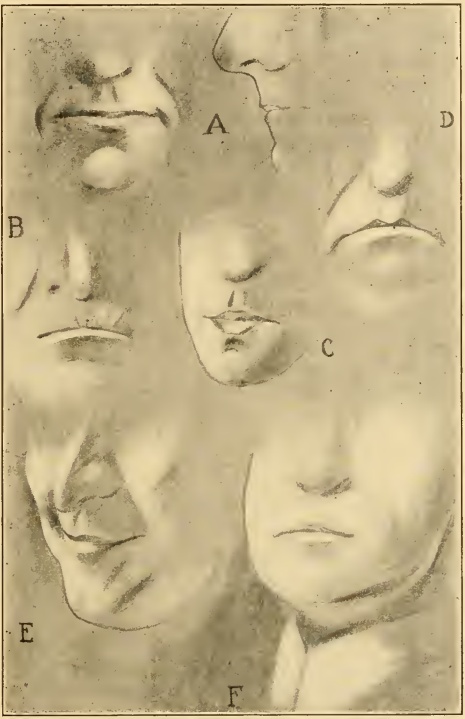

FIG. 10. — Studies in the expression of the lips. (See exercise 18, page 324.)

one series of expressions into another series. But when a boy of fifteen learns that he may go to the circus his pleasure will be revealed in rather modulated vocal expressions as com-

pared with those of the five-year-old. He will not jump up and down and wave his arms or clap his hands. His features will reveal the pleasure he feels but not so intensely as in the case of the five-year-old. An observer who was unfamiliar with the fact that at puberty the expression of any emotion tends to become subdued and who should observe these two boys would say that the five-year-old was anticipating very much more pleasure in going to the circus than the fifteen-year-old. But this may not be the case. The pleasure of the fifteen-year-old may continue without intermission from the time he learns that he can go to the circus until his desire is realized. But the pleasure of anticipation will be intermittent with the five-year-old. It will come and go; it will be intense while it lasts, but it will not be enduring.

Now compare the fifteen-year-old with the man twenty-five years old; it will be found that in the case of the latter the expression of pleasure is more restrained than it is with the former. The pleasure does not sweep through the whole organism and engulf it as is the case with the five-year-old; and yet the man will probably anticipate just as much "fun" as the young boy in going to the circus. Indeed, the pleasure he anticipates is likely to be more varied and richer in content than that of the youth, but the expression of it is kept under control.

With the adult expression is subdued, but it is more enduring than in the earlier years

The principle applies to the expression of all the fundamental emotions. When the four-year-old is angered by a playmate his emotion will be expressed by intense action of voice, features, biceps, fists, feet and bodily attitudes, not to speak of the effects on vital function — with which we will not be concerned here. But one rarely sees an eighteen-year-old individual who is engulfed by anger to such an extent as this. However, the anger of the five-year-old soon passes; in a

moment it may be replaced by expressions of friendliness. The emotion will leave no permanent set on the expressive mechanism; the scenes are continually shifted at that age. But it is different at eighteen. When the adolescent is angered the angry expression will not be quickly dissipated. The hard, set lines on the features, the harsh vocal timbre, the rigid attitude of the body may remain for hours after the episode which aroused the anger has been closed. At this age laughter and joyous expression do not replace anger quickly as they usually do in earlier years. When any emotion takes possession of the expressive mechanism of the adolescent, it is not easily dislodged. The principle is even more clearly illustrated when a mature person is made angry; the expression may be very subtle; it may take a practiced ear to detect it in the voice and a keen eye to detect it in the features and the bodily attitudes. But the individual may retain the attitude of anger undiminished for days at a time. The expression is likely to become fixed and gradually to settle into an attitude of hatred of the person who has incited the anger.

The principle holds for fear, affection, jealousy and the like; — the younger the child, the more intense and violent but the briefer the continuance of the expression, while in maturity the expression of all emotion is subdued, but the attitudes induced by the emotions are comparatively long-continued. We have recently had a marked illustration of the principle. When the armistice was signed which brought the World War to a close, people of all ages gave themselves for many hours to celebrating the event. But the hilarious and conspicuous celebrants were for the most part in the period of childhood and youth. Mature men and women undoubtedly felt greater joy at the conclusion of the war than did young people, and their joy was more enduring; but they were less demonstrative in their expression of their pleasure. In the universities the students

gave free rein to their emotions and indulged in shouting, singing, waving banners and hats, parading, throwing confetti and the like, while the members of the faculties appeared in contrast not to be deeply affected. They gathered together groups of students and others to impress upon them the significance of the event which they were celebrating, or they spent their time quietly witnessing the performances of those who were unrestrained in the expression of their joy. But within a few days the students had apparently forgotten the event and were laying plans for athletic competitions and other forms of student activity. But the members of the faculties were for weeks after the celebration nearly as expressive of their pleasure at the conclusion of the war as they were on the day on which the armistice was signed.

Why does expression become subdued with development?

Why should the expression of an emotion become subdued as development proceeds even when the emotion is felt more deeply in the later than in the earlier years? The explanation is found in the development of inhibition. The mature individual has learned from experience that it will prove a disadvantage to give way to any emotion, so in his case there are always restraining forces operating to prevent any expression from gaining complete mastery of him. And when the habit of inhibition becomes established, the individual *cannot* give way completely to his feelings of joy, even on such an occasion as the signing of the armistice. The attitude of moderation or restraint has become so settled in him that it is disturbing to him to express himself as the child does. A mature person does not feel at ease in shouting, tossing his hat into the air, jumping up and down, waving his arms, running hither and thither on the streets with his companions, climbing on automobiles and saluting passers-by and so on. He has been building up restraints against such expressions because ordinarily they would be a

handicap to him in life, and he cannot now revert to the abandon of his childhood or youth even when it would be an advantage to him to be able to do so. The principle is illustrated when adults attend picnics and try to imitate the freedom of adolescents. One can see that it requires an effort to break through the barriers which have been erected along the paths of emotional expression; the typical adult cannot act as spontaneously as a child no matter how much he may try so to do.

In this connection it should be noted that girls and women preserve their original freedom and richness of emotional expression more fully than do boys and men. A woman's voice, features, and bodily attitudes are all more mobile in expressing her joys, her sorrows, her fears, her anger, her jealousy, her hatred and her affection than is the case with the typical man of the same age. This may be due in part to the fact that convention requires a man to be more subdued and restrained than a woman in emotional expression. He may not weep when he is grieved; neither may he laugh as merrily when he is pleased or be so demonstrative when he is very fond of a companion as the woman may be. But there are undoubtedly native differences between men and women in respect to expression. We have seen in a previous chapter that reflection and especially foresightedness act as inhibitory forces and so lead to a conservative and repressive attitude in regard to emotional expression. The most reflective individual is as a rule the least responsive to emotional experience; he is not likely to let himself get out of hand; he is not overcome by joy or anger or any other feeling. It is as though he were constantly trying to solve problems and so were resisting any influence which would even temporarily distract his attention. This will explain in part why man is less mobile in expression than woman, for he more than she has borne the responsibility of solving problems. He has had

Women are more expressive than men

to keep the future in view more than she has, and this has made him less responsive to the experiences of the moment.

The reader will think of numerous exceptions to the rule that woman is more free and intense — more like the child — in expression than is man. The exceptions are undoubtedly increasing in frequency according as women are assuming responsibilities which require forward-looking and problem-solving. Women who are engaged in intellectual pursuits and especially in research approach the masculine type in regard to subdued expression. A woman instructor in a university or a woman physician or lawyer or legislator does not normally give as free rein to her emotions as does the typical woman one sees in everyday social life.

We should not leave this phase of our subject without mentioning the fact that there are racial differences in the freedom and intensity of expression. The Englishman is less expressive than the Italian or the Spaniard, for example. The Englishman thinks the south of Europe peoples go to extremes in their expression of joy, fear, affection, hatred and all other emotional experiences, while the Italian thinks the Englishman is rigid, indifferent and unfeeling. But Englishmen are freer in the expression of their emotions than the peoples north of them. The Northmen are constantly facing difficult problems in maintaining existence, so they must always be thoughtful in preparing to meet the rigors of nature. This develops a certain reserve in their expression; they cannot abandon themselves to their emotions. But it is different with the Spaniard. Nature is more kind to him. He can laugh and sing and dance and forget about the days ahead because his problems will not be as serious as those of the Northmen. He does not need so much food or clothing or fuel or such protection against hostile forces as the Northmen do. So he need not be looking forward so constantly and

Racial differences in expression

inhibiting the impulses of the moment; he can give himself up to the indulgence of his emotions and he will not suffer heavy penalties on this account.

There is a counteracting tendency which sometimes leads races that have to struggle hard against nature to abandon themselves at times to their emotions. Peoples who live in northern latitudes have occasions when they "eat, drink and are merry" in defiance of the dangers which threaten them, and in celebration of their conquest of harsh forces. They acquire fortitude by assuming to be indifferent to the problems of existence which they are required to solve. And also when they succeed in surmounting the obstacles in their path they abandon themselves to rejoicing more than if they did not have obstacles to overcome. To illustrate, — when a nation has been engaged in a deadly conflict with another nation and conquers it, the joy of the conqueror is unbounded, far greater than if it had not lived through a period of extreme storm and stress.

Thus far mention has been made only of expressional activities concerned with emotion; a word should now be said regarding the expression of thought. Most persons apparently believe that thought is revealed in characteristic featural activities and attitudes. We frequently hear one person say of another that he has a "thoughtful," "reflective" countenance. However, one rarely hears it said of a very young child that he has a thoughtful expression. As a matter of fact, during the first few years one does not see any expression which could be regarded as the accompaniment of reflection in the sense in which this term should be understood. Always the expression of the young child's features indicates feeling; reflective processes do not occur independent of dominating emotional accompaniment. It is quite impossible to indicate the precise time when

The expression of thought

reflection becomes so important that the individual may be occupied for a period in thought unaccompanied by feeling;

FIG. 11. — Studies in the expression of the eyes. (See exercise 18, page 324.)

but it is probable that this does not occur until the approach of the preadolescent age. Before this period a child may be observed critically examining the objects about him, and while the

examination is being made his body will be coördinated upon them; the brow will be knit; there will probably be tension of the eyes; the head will be inclined forward; in brief, all the expressions will be such as are required in order to bring the eyes and hands and, if necessary, the ears and the organs of taste and smell into connection with the object being examined. It would not be quite accurate, though, to speak of these activities and attitudes as the expression of thought, for the reason that we must regard thought as concerned with the organization and interpretation of the data of experience. We cannot use the term "thinking" for the process of gaining sensory impressions, but only for the organization and interpretation of these impressions once they are gained.

Taking reflection in this sense, then, we may ask, — Is thought at any time during childhood and youth accompanied by characteristic expression? There are two types of expression which accompany reflection. In the one case there is absence of activity in the features, especially in respect to the region about the eyes. The impression one gains in observing such a countenance is that while the eye may be open the vision is actually turned inward. The individual does not take notice of what is striking on his retina; he is actually seeing words or images which are internally aroused. When the individual is engaged in gaining impressions he seeks to bring the required senses into contact with the thing concerning which he wishes to gain information; but in reflection he aims to neutralize the senses, so to speak, in order that they may not report data which will interfere with the internal processes which are taking place.

There is another type of expression which often accompanies reflection and which becomes increasingly prominent as the individual develops. One often sees an eighteen- or nineteen-year-old person trying to solve a geometrical or grammatical

or some other kind of problem, and the impression made upon the observer is that he is endeavoring to overcome obstacles. There may be furrows in the brow; the eyes may be converged as though concentrated upon a near-by external object, and sometimes they may be closed as though to shut out disturbing impressions; the hands may be clenched and the lips compressed. The expressions suggest that the individual is engaged in a struggle. What is he striving to accomplish? The purpose of all reflection is to bring an ill-understood or unknown datum of experience into accord with what is already understood. In geometry a new problem must be harmonized with problems already assimilated, and the same principle holds for all problems whatsoever. When the individual is reflecting he is endeavoring to organize what he knows and mobilize it so as to bring it to bear upon the problem he is considering. If there is no objective problem to be solved then his reflection will be concerned with establishing congruity and harmony among his experiences. Incongruity is always a source of distress to an individual and so he will keep turning incongruous experiences around in order to look at them from various angles. He tries to break up complex experiences to see how they are constituted in the hope that he may discover some characteristics about them that will bring them into accord with his assimilated experiences.

Reflection involves strain and effort

To illustrate, let us say that an individual, as a result of his observation, his reading and the instruction he has received has established the conviction that the Creator founded the Christian religion and that Christianity affords the only safe guide to life. But now some Christian nations engage in war and practice cruelties upon one another. This fact will not assimilate with the individual's established convictions regarding the Christian religion. It is a disturbing element in his life, and he will probably be engaged continually in the effort

to bring this new experience into harmony with his established beliefs. He will examine every aspect of the new phenomenon. He will scrutinize the cruel and barbaric actions of the belligerents in the effort to see if he can find a motive for them which will be in accord with Christian teaching. For months he may be engaged in this process, and while he is engaged in it his features and bodily attitudes will reveal the struggle he is passing through. While he is reflecting he may lean forward and support his head with his hands as though his task were too great for him. He may rub his scalp with his hand as though he were removing an irritation; and continuously the brow may be knit as though he were constraining himself to put forth all his effort. Occasionally he may lift his shoulders and take a deep breath as though he had been holding his breath in order that he might concentrate all his energy upon the task in which he has been engaged.

It has already been intimated that these expressions of reflection are never seen in the features of very young children. They will appear only when the individual begins to organize and harmonize his experiences, which is not much if any before the pre-adolescent period. During the earliest years the intellectual processes are concerned principally with the acquisition of comparatively simple data which do not have complex characteristics and so which do not require much scrutiny or interpretation. In his school work the young child is engaged principally in acquiring concrete data and only very slightly in elaborating and organizing what he gains. His spelling, reading, number, geography, language, even his history and literature do not require organization of experience except in a low degreee. The relations between the data which he acquires are quickly discovered; he does not have to trace subtle and recondite relations. But as he goes through the high school and the college his knowledge becomes ever more complicated

and so he must be engaged ever more largely in the process of organizing experience; and more and more the expressions of reflection as described above become prominent.

The expressional activities discussed thus far have been principally of the nature of reflex accompaniments of emotions and to a slight extent of reflection. These activities are not purposeful in the sense that they have in view the attainment of any definite objectives. The individual does not perform them for the purpose of making his thought clearer or his feelings more emphatic to his observers, although it happens fortunately that his expressions do reveal to his associates the character and intensity of his feelings, and so they serve as a guide to the way in which they should deal with him; but the individual is not aware that his expressions are thus of service to him. As we have seen, they are remnants of once useful activities in defense and offense, in securing objects of value, and in relaxation of tensions developed by strain and stress in the struggle for existence. On this account they are of service in adaptation even though the actor is unaware of their serviceableness and could not deliberately employ them with a view to promoting his welfare.

Purposeful expressional activities—Gesture

But there are expressional activities which are performed deliberately by the individual for the purpose of amplifying or defining his thought or for interpreting and emphasizing his feelings. These activities are generally denoted roughly by the term "gesture." As this term is commonly understood it refers to bodily attitudes and to movements of arms, hands, legs, and head, deliberately executed for the purpose of conveying ideas to one's fellows or inciting them to action. The arms and hands play the principal, though not the sole, part in gesture in the sense in which we shall here consider it.

The activities of the infant's arms and hands are entirely random in character. When he beholds his mother his arms and

legs are usually violently agitated, but they do not have a definite relation to the end he wishes to achieve, which is to induce his mother to hold or to feed him or to entertain him. By the fourth month, however, when he desires to have her take him, he will extend his arms vigorously toward her. By the seventh or eighth month, if he wishes an object which he cannot reach and there is a person near by who can help him he will project his arms in the direction of the object, meanwhile uttering sounds which the observer interprets to mean that the child desires to secure the object. If he is lying down his legs will be set in motion and his whole body will reveal lively feeling. The activities of his arms will convey to the caretaker the direction or definiteness of his desires, but his gesture is made emphatic by vocal and featural expression and bodily attitudes. The function of the gesture is mainly to define his desires while the function of the accompanying expressive activities is to attract and hold attention and to impress the importance of his desires.

The year-old child relies quite largely upon gesticulation to amplify his thought and to define his desires to his caretakers. His skill in the use of gesture continually increases until about the third year. From then on for several years there is neither increase nor decline, probably until about the eighth year. When the individual is slow in acquiring language, gesture continues to be used very freely until the age of eleven or twelve or even beyond.

As the child develops, he comes in time to use his arms, and to a less extent other members of his body, in what may be called figurative gesture. By the time he is three years of age — it is impossible to be precise with respect to the date when any of these activities appear because the date differs in individual cases and it never comes suddenly or violently — he begins to use his arms and body freely to convey

Figurative gesture

ideas of size, for instance, *bigness* and *smallness* especially. He sees a big dog, and in narrating the fact to father or mother he will lift his arms as high and swing them out as broadly as he can, and he will stretch his body upward and draw out his voice as though he were trying to make himself big in every way. He will do this in a more impressive way at four than at three, and still more impressive at six. At the age of nine or ten he will begin to abandon this method in conveying his idea of bigness. He will rely more largely than he did earlier upon the verbal terms he uses. He will say "an awfully big dog," and dwell on the words "awfully big." He will supplement the words with a modified form of the gesture for bigness, but he will not depend upon this to convey his thought as fully as the two- or three- or four-year-old child does. At fifteen he is not likely to use the gesture at all; he will now rely upon verbal symbols and particularly upon figurative speech rather than upon figurative gesture to reveal his experience. He will say that he has seen an "immensely big" or "tremendously big" or "enormously large" dog; or more likely still he will say that he saw a dog "as big as a horse" or "as big as an elephant," and so on. Thereafter figurative language and qualitative verbal symbols will play the chief rôle in conveying the idea of bigness or greatness.

In expressing the idea of diminutive size the child of three will spontaneously use gesture contrasted with the gesture for bigness. He may bring his thumb and his fingers together as if he were grasping the small thing he is describing, and his body will probably incline forward and appear to contract, as it were. He will make his voice thin as though he were trying to become as small in every way as the object he has in view. The child of six years will use somewhat similar gesture in describing minute objects, but by the age of fifteen this mode of expression will disappear; as in the case of describing large objects,

so with small ones, — reliance will be placed principally upon qualitative words as "tiny," "wee," and so on, and upon figurative speech rather than figurative gesture, though an orator may revert to the gestures of childhood in describing small objects.

The two-year-old child makes use of gesture quite largely to define to his associates the actions and qualities of the objects with which he comes in contact. Let us say that he has a dog which he has observed jump over the fence and he wishes to convey this idea to his mother. He has acquired the word for *dog* and possibly for *jump*, but he has not learned the words for *fence* or *over*. So he calls to his mother "Doggy! Doggy!" and then he jumps, at the same time looking and throwing his arms upward as though he were trying to mount over something high. This is definite enough for him, and usually it is definite enough for the one to whom he is conveying his idea. Again, the dog rolls over on the floor. He does not know the words for *roll* or *over*, but he knows the words for *dog* and *floor*, and so he says: "Doggy floor," and down he flops on the floor and rolls over. So he barks to convey the idea of what the dog does, using the word "doggy." He takes a stick in his mouth and runs around with it, again conveying an idea of an act he has watched the dog perform; and so on *ad libitum*.

The use of gesture in conveying ideas of quality and of action

From about the second year onward for several years the normal individual makes generous use of gesticulation in conveying ideas of action observed in the people and the things about him. He never at any age completely abandons gesture as an aid to the expression of ideas of action, but as a rule it declines according as his vocabulary enlarges and his facility in the use of the sentence increases. An orator, though, often tries to make clear the actions he is depicting by reproducing their essential characteristics. If he is describing a situation in which

soldiers "went over the top," he may incline his body and thrust it forward as though he, too, were going over the top. If he is talking of the flight of an airship, his arms will sweep outward and upward and his head and eyes will follow the movement as though he were watching the ship glide through the air. If he is describing a situation in which a hero knocks down a bully, his own fists will be clenched, his body will assume a defiant attitude, and he will bring back his arms as though to administer the blow to the villain. But the orator is rarely as facile and resourceful in the use of gesture to convey ideas of action as the child is, probably because he does not feel so great a need of it since he can convey his ideas more adequately by means of appropriate words and figurative language.

The use of gesture to emphasize feeling

Gesture is used by the child not only to make his thought definite to his associates, but it is used also to emphasize his feeling. As an illustration, take the case of a four-year-old child who, when he tells or listens to a story in which an ogre does harm to some innocent person, clenches his fists and sets his teeth as though he intended to destroy him. The fist is used figuratively by the child very freely after the age of six or so, as when, complaining of being kept after school by the teacher, he informs his mother that he will never stay again, and with his fist he strikes the table to emphasize his determination. There are innumerable situations as he develops in which the fist struck on the table or projected forward is symbolic of a defiant or an aggressive attitude, as though something were standing in his way or interfering with his pleasure and he intended to remove it or to destroy it. Public speakers frequently make use of this gesture to impress their convictions upon their audience. Even preachers in the pulpit strike at the evils which they are condemning, and the fist plays a prominent part in reënforcing the lessons they seek to teach.

There are many of these figurative expressions which the individual makes use of in the course of his development. He raises his brows, for instance, to express surprise or sometimes doubt or suspicion as though he were opening his eyes wide to view more clearly the matter under consideration. He makes a peculiar upward and backward movement of his shoulders to suggest that he is indifferent to the situation which is presented or which he is describing. He lifts his arms and his eyes upward to impress his feelings of reverence and submission. On the other hand, he casts his eyes downward to convey the feeling of repentance or humiliation or consciousness of sin. When he develops an idea which requires clear thinking and he wishes his hearer to grasp it, he extends his index finger toward his listener as though he were driving the thought into his listener's consciousness. This gesture is frequently observed on the platform, mainly by speakers who are striving to convey ideas across to their hearers. One rarely observes a speaker using this gesture who is aiming principally to influence feeling and to strengthen conviction.

Relation of gesture to language

It was intimated above that gesture serves as an aid to or substitute for language. If the child were born with a language ready-made so that he could convey his experiences adequately by means of it, he would probably make but little use of gesture. Feeble-minded individuals who never gain a mastery of a complex sentence and whose vocabulary is quite limited continue throughout life to depend largely upon gesture to convey their ideas. For instance, they continue to the last to point to different parts of their body to denote needs or services which they desire. They describe the qualities and actions of persons and things almost wholly by gesture. In respect to the use of gesture, they remain in the stage of early or of later childhood according to the degree of their feeble-mindedness.

The question may be asked at this point: "Why do persons who apparently develop at substantially the same rate in intelligence differ in their use of gesture?" Even in maturity there are marked differences between persons in respect to freedom in the use of gesture. This may partly be explained by a difference in national traits. We have seen in another connection that races differ in mobility of expression. The Italian is more expressive and also he gesticulates more than the Norwegian. The Irish are more expressive and they gesticulate more freely than the English. Then one can take members of the same race and he will find that one relies upon gesture more than another. In such a case it will probably be found that the man who relies least upon gesture is more intellectual and less emotional than the others. He probably assumes an attitude of reflection more often than the others do and so he becomes inhibited in respect to the use of gesture. One sees this principle illustrated in a university. One man may be engaged for long periods at a time in working out problems demanding reflection, and if he does not have experience in presenting his thought to others or if what he presents is devoid of emotion, he is not likely to depend upon gesture to help to make his ideas definite, for the reason that the character of his ideas is such that gesture will not assist in their portrayal. The thought is too involved, too subtle, too slightly connected with emotion to be revealed by direct or figurative gesture. Gesture would rather interfere with than aid in the interpretation of thought of this character. But this man may have a colleague whose thoughts have more direct bearing upon human conduct and welfare, and they may have an emotional setting so that gesture may be an aid in conveying the impressions which the individual wishes his hearers to gain. If this speaker should change places with his colleague and should have to present abstract and complicated ideas

Individual differences in the use of gesture

that would have no direct connection with behavior and which were not propounded for the sake of influencing conduct, he would be likely to abandon gesture and rely wholly upon other modes of conveying his ideas, — upon the choice of precise words, the use of pictures and other graphic means of conveying ideas, and so on. Gesture is too general and undifferentiated and non-precise to assist in conveying subtle, complicated thought.

CHAPTER VI

EXPRESSIONAL ACTIVITIES: GRAPHIC, PICTORIAL

We of to-day can hardly realize that there was ever a time when men had no means of revealing their experiences to those who could not observe their gesticulations or featural expression or who could not hear their voice. But our remotest ancestors had no methods of communicating their experiences to persons at a distance or to those who should come after them in time. That is to say, they had no graphic methods of expression; they relied entirely upon manual, featural, postural and vocal activities to reveal their beliefs, their aversions and their desires. The range of their expressional activity was enlarged when they discovered that they could communicate with each other by the use of signs in which they could reproduce by the positions or movements of their fingers, hands, arms and postures certain of the striking and distinguishing characteristics of the objects or phenomena about them. But this sign language served only as a medium of communication with persons who were present and could actually see the signs; it did not enable an individual to transmit his experiences to those who were remote from him in time or space. But the employment of gestural and postural signs paved the way for the elaboration of a system of communication by means of which ideas could be conveyed to persons distant from the individual in time and in space. It was found that by making pictures in reproduction of their gestural and postural signs they could convey their experiences to persons who were

The development of a sign language

absent; that is, they could suggest objects and their relations to one another and to themselves as well by means of lines in the sand or on stones or trees as they could by physical signs. In this way drawing originated. It played a rôle at the outset merely as a medium of communicating with those who were remote in time or space from the individual. By means of rude diagrams embodying some of the form characteristics of objects man found that he could suggest these objects to anyone who might see the diagrams; and by arranging the diagrams in certain spatial relations, it was found to be possible to suggest what the objects were doing or what the artist did with them or what he desired that others should do with them. Thus primitive man used his diagrams to convey to his absent associates what he would have conveyed to them by means of voice, grimace, gesture and posture if they had been within hearing and seeing distance of him. In this simple, crude way our modern complicated system of graphic language originated.

The development of linguistic symbols

It was intimated above that in the early stages of the employment of drawing as a medium of expression, primitive man used diagrams which embodied just enough of the characteristics of objects to suggest them to the observer. Fortunately experience with these diagrams led gradually to the realization that it should be possible to employ signs which would not have any direct connection with objects but which nevertheless could be utilized to designate objects. And if a sign which did not look like any object could be used to denote objects it would be more serviceable than a diagram which would be confined in suggestiveness to the objects which it resembled in some degree. When early man caught this idea he started on the development of a system of graphic signs which would be purely symbolic; — that is, they would have no pictorial resemblance to the objects or ideas which they denoted.

Coming now to the child, — how does he acquire these graphic means of expression? He does not have to learn grimace or gesture or intonation; does he have to learn drawing? He acquires spoken language readily through imitation; will he acquire written language in the same way?

Scribbling activities

Give a three-year-old child a pencil and a piece of paper and he will find pleasure in scribbling. So far as one can tell

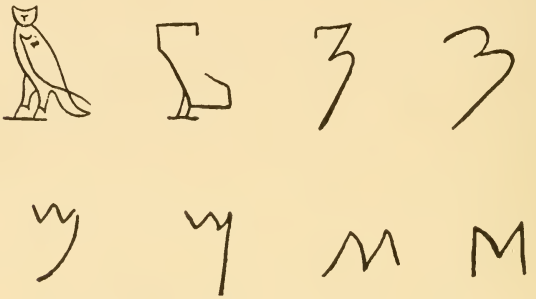

FIG. 12. — The evolution of the letter M. (See exercise 1, page 325.)

he does not make use of this scribbling as a means of conveying to those about him how he feels or what he wishes to do or what he would like to have them do. He seems to say, — "Look at these black marks I am making; it is great to be able to do a thing like this." He does not appear to say: "Look at the man I have made," or the dog or the horse.

This scribbling activity continues until the fourth or fifth year. It might continue longer if a child should be left entirely without suggestion or guidance; but it is apparently impossible for an adult to restrain himself from responding to a child's invitation to "make a picture of something." A four-year-old child who has pencil and paper will beg a bystander to

"make a picture" for him, and the bystander will usually make diagrams resembling those made by early man; and a particular diagram will as a rule represent the same object that primitive people used it to denote. A three-year-old child will make a number of lines without any definite relation to each other and then exclaim: "Look at Kitty," or "Look at Daddy,"

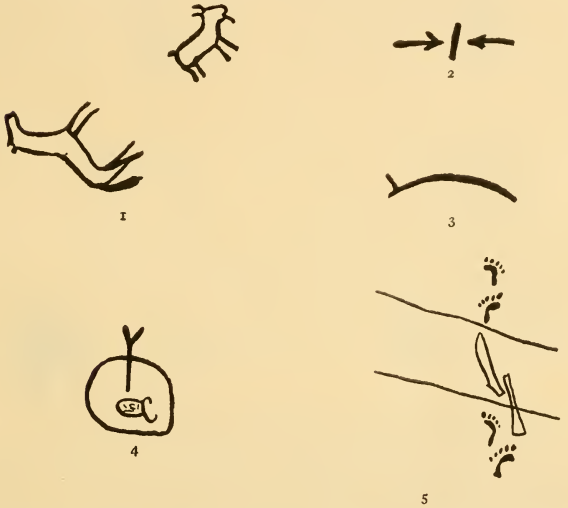

FIG. 13. — Examples of pictorial writing. — 1, Warning; 2, Combat; 3, Morning; 4, Wheat stored in pit; 5, Traveling on foot, and by water. (See exercise 2, page 325.)

or some other person or object. The expression of his features will indicate that he is pleased with his handiwork, but it is probable that what really gives him pleasure is not only the product of his efforts but also the act of making the picture. He still is in the stage when he enjoys merely managing a pencil. Between the fourth and the fifth year, however, he nor-

mally abandons the scribbling stage and enters the diagrammatic stage in graphic expression. When he enters the latter stage he will no longer be interested largely in the muscular activity of running his pencil over the paper; he will strive to make pictures that bear at least a slight resemblance to objects.

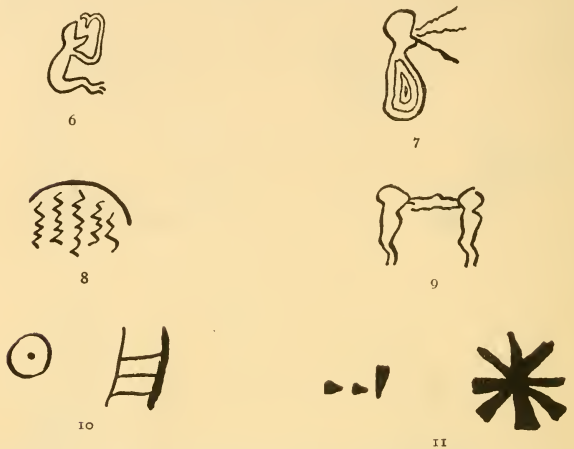

FIG. 13 *a*. — Examples of pictorial writing. — 6, Eating; 7, Singing; 8, Snow; 9, Conversation; 10, Sun; 11, Star. (See exercise 2, page 325.)

Studies of children's drawings

From this point forward, the child's development in respect to the use of drawing as a medium of expression is of great psychological and educational interest. With a view to studying this matter the writer conducted a series of experiments designed to determine the relation between the child's diagrams or symbols or pictures and the ideas which he seeks to convey by means of them.

Two principal lines of investigation were undertaken, each supplementing the other, the object throughout being to study

the relation of spontaneous drawing to the contents and operation of the child's mind in certain directions. In the first place, an investigation was made of the general form and characteristics of representations of objects that were drawn to illustrate a bit of narration or description, usually cast into the story form; and also, drawings made from objects seen and from memory were studied in the same way. Second, the relations in time and place, and the proportions shown in the objects drawn were studied; and an attempt was made to discover whether or not they portrayed relations and proportions actually conceived by the child. A large number of drawings for these studies were obtained from school children; and there were, in addition, some younger children between three and four years of age tested in their own homes. Most of the pupils who made drawings were subjected to tests of vision and motor-ability and the results kept in record with other data concerning the drawings, and careful statements based upon close study of the physical and intellectual characteristics of each child were obtained from several teachers under whom the drawings were made; and these were taken into account in certain studies.

It was found after considerable experimentation that the attempt to interpret these drawings as expressions of the mental characteristics and activities of their authors, or to account for them if they were not such, necessitated close familiarity with the habits and capabilities of mind and body of a number of children in order to examine everything that could in any way contribute to an understanding of the peculiarities shown in their drawings. For this purpose about fifty children in a normal school were studied in a thorough manner. About ten thousand story drawings have been obtained from children between the ages of four and eleven, at least six being made by every child; while from the fifty children upon whom special

studies were made an average of thirty-five drawings were obtained, these being made at intervals extending over a period of nine months. Such stories as "The Three Bears," "Johnny-Look-in-the-Air," "The Lion and the Mouse," "Jack Frost," and quite a number of original stories for the purpose of bringing in certain objects in particular relations and events were used. These were read or told twice to the children, who were then asked to tell them back on paper without help from anyone.

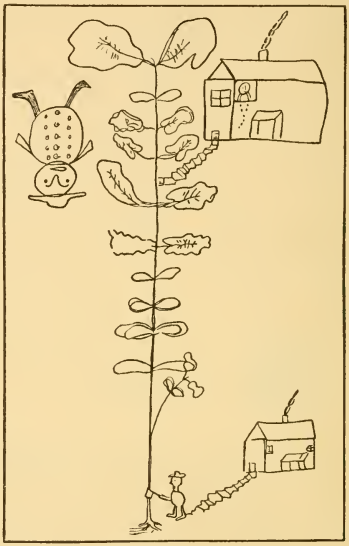

FIG. 14. — Jack and the Bean Stalk. (See exercise 3, page 325.)

In the study of these drawings the first question asked was: "Do children refrain from drawing certain objects in a story because of the difficulty of representation?" As an aid toward answering this, the children were given complete freedom to express any difficulties which they encountered in illustrating a number of stories, and to consult the experimenter upon any point that troubled them. They were closely observed while a story was being read to them and during the making of the drawings; and when they had finished their task the story was told orally by them without consulting the drawings to see if objects and events

Difficulty of representation no barrier to expression

were remembered that were not pictured. From the records of five hundred cases studied in this way, about one per cent indicated that they could not represent certain objects, among these being a bridge, a horse and carriage, and a fairy that had a part in one of the stories. However, only four children out of thirty specially tested failed to draw the fairy; and there was no hesitancy either in representing the wind, "Jack Frost," and other invisible things. It seems that with children of this age there are few objects ever seen or heard of that are too difficult for speedy and confident portrayal.

But while all objects are readily and easily drawn as a whole, still children often say that they cannot represent the activities or some of the special attributes of an object. In the story of "Silverhair" when she is running away from the bears, the children sometimes say, — "She is running, but I cannot make her so"; or they cannot show both feet turned the right way when a boy or girl is walking, but instead the feet are turned in opposite ways. And so there are other traits of objects similar to these which individual children find trouble with; but this does not seem to hinder them from representing difficult objects as a whole so that a story may be told.

Older children are inhibited

It is probable that children from five to nine or thereabouts represent the objects involved in illustrating a story about as readily and with as much pleasure as they would in repeating the story orally. After the age of eight or nine, however, the difficulties of representing begin to loom large, and there is less confidence and satisfaction in the work. To test this especially, a number of children of different ages were required to draw, first, an object or person present, and then from memory some object or person well known to them; and while not one in ten children up to nine years of age made any objection whatever, those beyond that age had to be encouraged to do the best they could; and

many of them seemed quite overpowered at first, especially in representing a boy or girl whom they could see. It was noticed also that younger children rarely hesitate in drawing from memory, but go straight to work with their lines and dots to make man, woman, child or other object, while older children seem to be absorbed in meditation and do not draw so readily. It is true that in older children's drawings, more characteristics and qualities of objects are shown; and it seems probable, also, that qualities are perceived or remembered that require deliberation to picture, and sometimes the task is too difficult. It should be said in this connection that young children do not always represent in their drawings all they remember of an ordinary story; but this must be accounted for, probably, by their physical inability to continue a great time at any one task, and must not be laid as a rule to their consciousness of inability to represent objects. Children sometimes repeat orally more than they told upon paper; and they say, in apology, that they were in a hurry or had no room, but hardly ever, except as noted above, that they did not know how to represent given objects or situations.

One of the most important studies made was upon the diagrams which the children used to represent objects, the aim being to trace out the origin of the peculiarities characteristic of each child's drawings. The question was asked,—What has led a pupil to make this distinctive kind of diagram to represent a given object? With children from five to eight or nine the human face is shown round or oval, with two dots upon it for eyes, something of a scrawl for a nose, and one for a mouth. But ears and hair are not so often found, while the body is either a single line or an irregular oval, with lines branching off from it for the limbs. From two to ten lines on the end of each arm represent the fingers; there is never a hand as distinct from an arm, and quite often even the arms are omitted, but never

the lower limbs, showing that the youngest child appreciates the need of something to support the body. In some of the drawings of children of this age there are evidences of raiment; and in every case, with children of all ages, girls are clothed, even in drawings where the boy figures never show any trace of clothing. Occasionally a hat will be shown on a boy when there is no other article of clothing. These are substantially the characteristics that always appear in a representation of the human form, the only exceptions being that with some of the older children the faces are made in profile and the relations and proportions between the different parts of the body are more nearly in accord with the facts in the case, and the various members of the body are more clearly indicated. Sometimes a few other features are added, such as buttons on the coat, feathers on the girls' hats, and buttons on the shoes; but these are comparatively rare.

The child's diagrams embody the most essential characteristics of objects

A tree is at first a vertical line with half a dozen branches shooting out on either side, and these do not bear twigs and leaves until the artist is eight or nine, when a substantial trunk also begins to appear; and quite often the roots are as visible as any other part, and apparently of more importance. A house usually has a roof and two sides shown, although in a number of cases the end of the house only is seen. There is always a chimney with smoke twirling up to the clouds, and hardly ever more than one door, but all the way from one to ten windows. Animals have long oval bodies with legs, tail and head in profile; and even in drawings where the human face is always a front view, animals' faces will be in profile. A table is a horizontal line supported by four vertical lines. Beds and chairs show some diversity, and yet every one contains the essential characteristics. Windows have four bordering lines with two bisecting lines, vertical and horizontal. There is

much diversity in the drawing of a river, probably explained by the fact that many children have never seen a river, and the only characteristic they know about, or at least think about, is water; and this they put into square or circular patches, narrow or broad areas, and various other forms.

Enough has been said to indicate that one basis for the diagram made by a child to represent any object is his comprehension of the distinguishing characteristics of that class of objects. A child's diagrams are, in a rude way, pictures of the concepts he has of the various classes of things that he tries to represent. The young child is not usually concerned with anything but fundamental attributes, and his diagrams are built on these alone, while with older children it seems that additional characteristics are added as they are perceived and their relations comprehended; and it is probably the consciousness of the great number of characteristics which inhere in every object that overpowers the child of twelve or thirteen in his effort to represent them all in their right relations.

Always the same diagram for any given object

A significant fact about the diagrams for any object is that they are always the same as drawn by any one child; and while all display certain fundamental characteristics, there are still some features in each individual case which make each child's diagrams peculiar to himself. An attempt was made to account for this individuality by inquiring if a child takes some object in his environment as a model in his representations of that object in any story. About four hundred drawings were studied with the coöperation of their authors to determine whether the objects they had represented had characteristics like those which were best known to them. An opportunity to test this was afforded by the use of several stories in which the exterior as well as the furnishings of houses were represented a number of times by each artist. In no case did an artist

attempt to reproduce the form of his own house, although three school buildings had steeples somewhat like the buildings where the pupils attended school. The other school buildings were mainly symbolic with no indication of the influence of any particular building in their composition. The interiors of the homes were much alike, most of them showing an upstairs and downstairs with some appropriate furniture. Every one had stairs to reach the upper story. In several instances stoves and the entire length of stovepipe to the chimney were shown, and these were copied from their own or a friend's house.

Special characteristics of objects not included in diagrams

The evidence indicates that the child uses his symbols to represent objects without care to make his representations reproduce the *special* characteristics of any particular objects. Several series of experiments yielded data in favor of this view. In the first place, the diagrams used in the representation of any of a number of objects were traced throughout the whole of the children's drawings, which extended over a year with the pupils in one school; and with many of the most familiar objects, as boy, girl, tree, house, sun, sky, stars, ground, four-footed animals and so on, there was an average of one hundred and sixty representations made by each child. The result of this study has shown that the peculiar diagrammatical representation of any object is strikingly characteristic of a child in all of his drawings; and any one characteristic that appears in an object in any picture will be shown in all the pictures of that object drawn. Some children always show roots to a tree; always have the feet in human beings turned out in opposite directions; always have the arms straight out; some always show the buttons on clothing though the clothing itself is lacking; some show the interior of a house in every picture of that object they make; some make the sun in the sky, and trees, grass and flowers, even when these are not mentioned in

a story. One cannot observe many of the drawings of a child without seeing that his symbols are used to represent classes of objects without any attempt being made as a rule to indicate special characteristics of particular members of these classes.

To test this somewhat farther a number of children from whom many representations of men and boys in their story drawings had been secured were requested to draw some boy or man at whom they could look. In a number of cases the writer posed as a model, while the children with great earnestness and readiness represented him on paper. It was interesting to note that no matter in what position he stood the same picture would grow under the artist's hand as he had made hundreds of times before in his story representations with no one to look at. Young children who made full front views in telling a story would make a front view when they saw a model in profile. It seems otherwise with older children, though, for the writer has been unable to induce those above ten to represent readily a person whom they could see, and who stood in a different position from the one they had been accustomed to represent in their story drawings. In addition to representing an object that was before the child, a number of drawings were obtained in which some familiar playmate was represented from memory by the side of representations of the writer in various positions; and the drawings were all substantially the same.

Another experiment along this line was tried with many children between the ages of five and seventeen. They were required to draw a chair or table or other familiar object, and care was taken to place it in such a position that it would be easy to represent. Directions were given to reproduce the object, and it was not intimated in any way that the ornamentation was or was not to be included. The results showed that with children of five the ornamentation was *never* represented; with children of eight exactly fifty per cent of the drawings showed

evidence that their authors tried to reproduce the ornamentation; while with persons of sixteen, some of whom had had but little instruction in drawing, eighty-seven per cent represented the object as ornamented. It seems that young children do not regard details in things, but look upon them as wholes, capable of being put to some practical use; and they just make marks to represent parts of that whole. It is probable that the young are concerned at first mainly with the *uses* of things, and only after a time come to observe and appreciate detailed characteristics; and it is the same in drawing several objects to tell a story as it is with single objects. Their interest seems to be in the total event described or narrated, and they go to work to picture this thought whole, paying but little attention to the making of individual things required to portray the various events.

FIG. 15. — One child's illustration of "Johnny-Look-in-the-Air." She made six scenes to tell the story. (See exercise 5, page 328.)

The purpose of the last study made was to discover whether the logical relations and proportions shown in drawings correspond closely with the artist's actual conception of them.

In some drawings there is nothing but confusion and disorder displayed throughout, while in others it is easy to discover the logical relations of events, and the proportions do not impress one as being very unreal or unnatural. With some children, it seems that as many objects as are remembered are put in their drawings wherever it is convenient to place them, and only very few of the actual relations existing in nature are indicated. It is always true, however, that the sky is the topmost thing in a picture, and the sun, moon, stars and clouds are above everything earthly. The ground is always under a house. Smoke always rises from the chimneys; and a few other similar relations always seem to be shown correctly even by the youngest children. But if a boy is walking along the road and eventually falls into a river, the river may be placed off in the corner of the picture entirely disconnected from the road. How the boy could fall into it is apparently never thought out by the artist. People go

Are logical relations revealed in children's drawings?

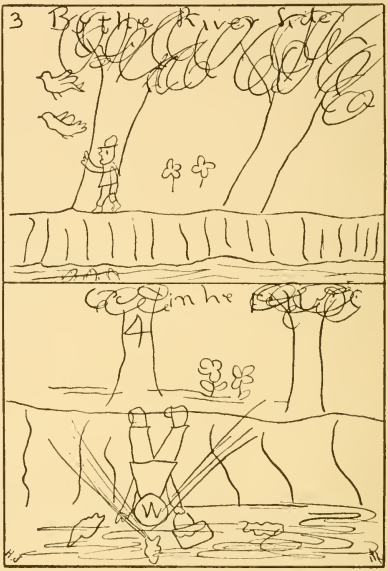

FIG. 15 *a*. — One child's illustration of "Johnny-Look-in-the-Air." She made six scenes to tell the story. (See exercise 5, page 328.)

into houses that have no doors or windows and steps run up to the rear of a house where there is no door. Fishes are shown living out of water; the sun appears lower than the clouds; and hundreds of other impossible relations are frequently seen. Something of the same lack of consideration of relations can be observed in the proportions shown between the objects in a picture. Bears are made as large as the house they live in, and a dozen times larger than the doors they go through.

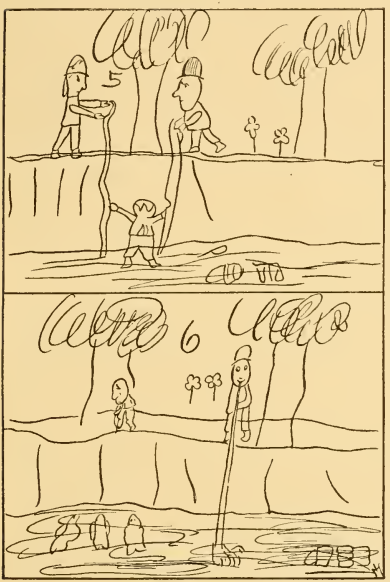

FIG. 15 *b*. — One child's illustration of "Johnny-Look-in-the-Air." She made six scenes to tell the story. (See exercise 5, page 328.)

Some children tell a whole story in one picture, while others make a number of pictures to tell the same story. It has been found, however, that artists below eight or nine years of age find no difficulty in putting everything they think of into one picture. Some work out a portion of a story logically and then fill in the rest of it as best they can, all in one picture. In "The Three Bears" there is a possibility of twenty different scenes showing the progression of events; and this was first read to all of the children as a whole and reproduced

from this reading. One exceptionally bright girl thirteen years of age made thirteen views in a half hour's drawing, missing no one in regular order as far as she went. No other drawing had more than eight. This same girl made seven views for "Johnny-Look-in-the-Air"; and it may be mentioned that she was known to all of her teachers as the brightest pupil in the class. But of all the children studied, very few made more than one drawing to represent "The Three Bears," while a number made two to tell the story of "Johnny-Look-in-the-Air," and two or three to tell other stories that had from six to fifteen distinct scenes in them. It can be said in general that with children up to eight or nine years of age, a whole story is crowded into one or two pictures, which makes it in some measure illogical and confused.

It would perhaps be too hazardous to say that the general logical relations and proportions expressed in a drawing are a good index to a child's mental operations and conceptions; but it is worthy of note that a teacher who has had charge of a child for some time will, on seeing his drawings, say in almost every instance that she would expect such results as were secured. Here, for instance, is a series of drawings in which there is utter lack of logical relations; an object is represented as it happens to come into mind without regard to any other object in the story. The artist will be found to be either mentally or physically weak, or very restless, or constantly absorbed in what is going on about him. On the other hand, the children who impress their teachers as being bright, and who always show interest in what they are doing, usually make drawings that preserve the logical arrangement of events and objects, and in which the proportions are fairly good.

It may be said that a lack of right proportions in the objects in a child's drawing is not necessarily indicative of his inability to conceive the true proportions of these things, but

that objects are drawn out of proportion to indicate the relative importance which they have in his mind. There can be no doubt that this is true in some cases; but in others it is hardly true, as when a table is made twice as tall as the girl who is to eat from it. With some children only one thing is held in the mind at a time, and when this passes out, the next object takes entire possession of consciousness, so that when a picture is completed the several items are out of proportion and out of sequence. The factor of temperament, whether nervous or calm, easily discouraged or persevering, and so on, has an important influence upon a child's logical thinking. It determines whether ideas or pictures come and go without much power of restraint and control, or whether they linger in the mind and are not dispelled every instant by some distracting influence. In all the drawings a record was kept of the order in which each object was made, and in some it was noticed just how and in what sequence the parts of each object were represented. In some cases studied, children would build a house and then put ground under it; or they would make the furniture of a house and put the sides and roof around it afterward. Quite a number of the children observed made the sky first, and then seemed to fill in everything else as they happened to think of it. One restless girl without much power of application, but possessing some native brightness, proceeded this way in making a human being: she first made a round head, and then a loop for a body; then one leg and dressed it with pantaloons; then she made the ground for the leg to stand on; then she made the other leg and dressed it with pantaloons and made the ground for it to stand on. Then she made the arms and dressed them. Next she put in the eyes, ears, nose and mouth in the order given. This illogical method of procedure corresponded in a way to her incoherent manner of thinking in all her studies.

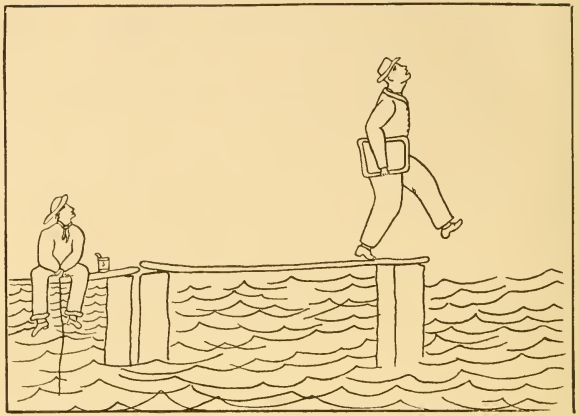

FIG. 16. — Illustration for "Johnny-Look-in-the-Air." (See exercise 5, p. 328.)

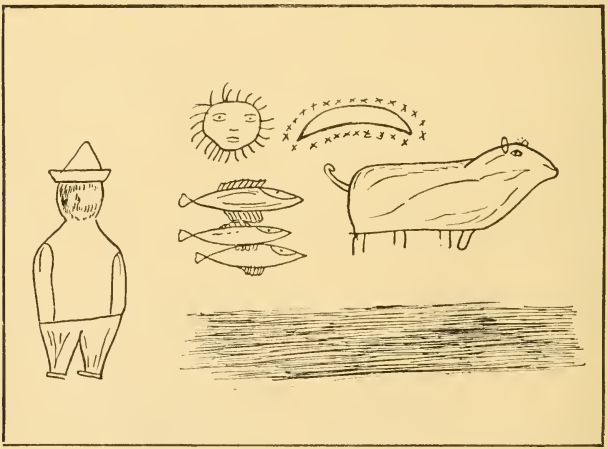

FIG. 17. — Illustration for "Johnny-Look-in-the-Air" from a child artist. (See exercise 5, page 328.)

Young children and often older ones experience difficulty in portraying a special kind of relation, as for instance a man riding a horse. They can show people and articles of furniture in a house readily enough; one can simply look through the walls of the house and see them. The child knows they are there, and he does not reflect that there is any obstruction which would prevent an observer on the outside from seeing them. Again, he does not hesitate in showing the seeds in the middle of an apple or the buttons on the back of a girl's dress when she is being viewed from the front. When he draws a human being in profile he shows the arm on the opposite side of the body without any hesitation. But when he tries to place a man on a horse the relation troubles him. The usual method is to draw the horse in profile and then to draw the man equipped with all his members up above the horse. One can look through the horse and see the man's off leg. The child is so engrossed with making each object separately that he does not consider their natural relations. By the time he reaches the age of nine or ten, however, he realizes that the man must be put down on the back of the horse, but almost without exception he will show both the man's legs. And so with all situations of this character; up to the age of nine or thereabouts an artist will represent a unity composed of several objects brought together in special relations, as when several people are riding in an automobile, by making his diagram for each object as though it had no connection with the other objects and so did not need to be modified in any respect.

Difficulty in representing special relations

It remains for us now to inquire whether the child will on his own initiative and without instruction attain a high degree of proficiency in the use of drawing as a medium of expression in the same way that on his own initiative he will acquire the spoken language he hears in his environment. It may be said

without qualification that the individual does not feel the need of enlarging and perfecting his drawing vocabulary, so to speak, as he does his spoken vocabulary. A ten-year-old child who hears a new word within his range of comprehension and execution will practice it until he masters it. As he develops, he will acquire the linguistic usage in his environment, though he may not have any instruction in regard to the matter. But while a four-year-old child will largely on his own initiative acquire the diagrams which have been described in the preceding paragraphs if he sees others use them, still a twelve-year-old pupil will not continue to master drawing as a more perfect medium of expression even though he observes artists employ drawing to convey a wide range of experience. Indeed, the twelve-year-old child if let alone will as a rule abandon drawing as a medium of expression. He will not be satisfied with the diagrams which served him well enough in his earliest years and he will not of his own accord acquire more perfect modes. Language is a far more "natural" mode of expression for the child than is drawing. He will learn complex forms of linguistic expression without any suggestion or direction from the people about him; but he will not acquire complex modes of graphic expression without great effort. As a matter of fact, a large proportion of adults never make use of drawing in expressing experience of any kind. Even those who have had instruction in it abandon it because of their feeling that they cannot portray what they see or what they have in their minds with sufficient fluency and accuracy to make the use of drawing of value.

Language acquired more easily and naturally than drawing

In order that the individual may continue to find his drawing a serviceable medium of expression as he develops into the teens, he must above all else acquire the ability to give attention to the form values and the color values in the objects he

wishes to portray, and he must become able to see them in their relations and activities with the eye, as it were, rather than with the mind. If a novice wishes to portray a human face, for instance, he is likely to be overwhelmed with the difficulty, and he may think his impotence is due to the fact that he has not mastered the technique necessary to represent this object; but in reality his trouble is due to the fact that he does not see the form or color characteristics of the human face clearly or vividly enough to reproduce them. He is not concerned primarily with the form and color values of the face; he is concerned rather with what these values denote. He does not and cannot give attention solely to form and color data. He thinks only of the character or temperament of the individual as expressed through form and color data. Form and color play a very minor rôle in the total impression of the human face which the novice gains. And when he comes to represent the face, it is what he knows about it and not what he actually sees in a visual way that stands forth in consciousness, and so he cannot portray it.

The psychology of drawing

CHAPTER VII

THE DEVELOPMENT OF COÖRDINATION

THERE are a few simple coördinated movements of which the infant is capable from the beginning. Put your finger in his mouth and note how facile and definite are the coördinations of tongue, lips and jaw involved in sucking. Again, the child at birth has some control over his vocal apparatus, enough at any rate so that he can produce one or two vowel sounds. He has, too, become possessed of the ability to manage his arms to the extent that he can extend and contract them; and he can grasp an object placed under his fingers and convey it with considerable accuracy to the goal of most of his movements at this time, — his mouth; and after more or less awkward fumbling the fist usually finds its way into the mouth. When the hand comes in contact with the skin anywhere in the neighborhood of the mouth, reflex movements are set up which have for their aim to bring the stimulating object into the mouth. Burk thinks this performance is at first a mere accident, while Preyer, Miss Shinn, and others regard it as a quite definitely established coördination.

Coördination in infancy

While there are these few relatively simple coördinations of which the infant is capable at the start, still the inventory of the entire list is easily made. Practically the whole business of becoming coördinated in adjustment to a complex environment lies before the individual. In the beginning most of his energy seems to be expended in clenching his fingers, in keeping the muscles of his arms, hands, and legs constrained, and in moving them back and forth in one plane. There is little

amplitude, little variety, and but slight complexity in these first movements. They are mainly general, in the sense that the biceps, for example, in the manual series, are vigorously energized, but the very tips of the fingers cannot be employed with any success in fine coördinations. Note the manner in which an infant will grasp a pencil, for instance, or a saucer, and it will be appreciated that his will has not yet gained control of the tips of his fingers so that they can be utilized in the execution of tasks requiring precise coördination. The infant appears to have almost as good use of his toes as he does of his fingers, and this is worthy of remark, since the skill in managing the toes is lost in part as development proceeds, while finger-skill constantly increases. Again, though the infant can respire perfectly, still he has but slight management of his lips, tongue, teeth, and palate in the modification of the expired air so as to produce consonantal sounds.

The first stages in acquiring manual dexterity

How does the child acquire manual dexterity, by which is meant ability to manipulate with precision any segment of the manual system in coördination with any other segment, or any part of the organism, or any external object? The first sign of advance is seen in what may be regarded as a sort of relaxation of the original biceptual tension; the biceps seem now not to be stimulated so vigorously and constantly as formerly. Some observers have attempted to be precise as to the hour when changes of this sort occur, but this appears to be a quite impossible task, since these really have no absolute beginning. They are phases of a continuous process of differentiation and of developing complexity. Progress along this line is made with unequal rates of speed by different children. In the development of arm-, hand- and finger-skill, H. showed considerable advancement by the seventh week. By this time she was operating the whole-arm system during most of her waking hours; but the original rigidity was less

apparent, the fingers were opening and closing constantly, and the thumb began to play a part in adjustment to the fingers. Until the seventh week, the thumb had not reported for duty; it kept itself hidden most of the time in the palm of the hand, a phenomenon which many observers have commented upon. But M. developed much more slowly than H. When she reached her seventh week she had not traveled a great distance from the starting point. S., a boy, appeared to be at least a week or two behind his sister, and V. was later still. Of course, lacking the means of exact measurement it is impossible to determine rates of progress with absolute precision.

The urge of development is toward the extremities

As the child develops he constantly gains greater flexibility and efficiency of hand- and finger-movement and greater amplitude in the employment of the arm as a whole. There is a gradual increase in the action of forearm, wrist and fingers. The wave of development moves constantly outward, — toward the extremities. This does not imply, of course, that there is not continuous development all along the line; it means simply that at the start the most accessory members, as the tips of the fingers and the tip of the tongue, function the least effectively, considering what they are designed to accomplish, and so development has the most to accomplish in the outermost coördinations. What progress in this respect has the child made by the sixth month? Preyer reports that his son showed much deftness before his seventh month in picking up shreds of paper from the floor; but the term "much deftness" is quite indefinite. Bits of paper may be taken between the thumb and fingers without very precise control of the most accessory segments of the manual apparatus. As a rule, children of this age grasp at everything they see. They pick up smallish objects wherever they find them, but their adjustments really seem very crude and ineffectual when measured by the adult standard, which is the

only proper basis of comparison. It does not serve our purpose here to compare the child's present skill with his condition at the very beginning; nor should we accept the evidence of the mother who marvels that her child should be able to seize hold of anything by the seventh month. Her wonder and admiration are likely to lead her to believe that he executes his tasks with as much delicacy and deftness as she does herself.

FIG. 18. — Note the effort required for some of the children to perform the coördinated task demanded of them. (See exercise 13, page 331.)

The child at six months, or a year, or even two or five years, is long in gross muscle and short in delicate coördinations. He expends more force in the performance of such a task as threading a needle, for example, than an adult does. One may see this principle illustrated in the tension of muscles that should remain at rest when the child applies himself to delicate tasks of any sort. In all his coördinated activities in the early years, the characteristic which impresses one most markedly is the amount

of energy which is expended on them. Even the caresses of a year-old child, which he intends doubtless to be gentle, are often annoying because of their vigor. When he is attempting acts that should be done tenderly, as touching his father's eyes in play, he jabs into them as though he had little control over his biceps. Most mothers who have tender babies in a house where there are vigorous five-year-old boys have occasion to learn

FIG. 19. — Gardening requires the use of the large muscles principally. (See exercise 13, page 331.)

that the latter tend always to express their kindly feelings most energetically and crudely.

As the months pass we may note that coördination increases and mere muscularity decreases. If one tests a child of three years at threading a needle with a moderate-sized eye, it will be noticed that the fingers become very rigid and soon tension will be observed in the face and elsewhere in the body. Scissors are used very badly at this period, and writing with an ordinary pencil causes excessive tensions. In the use of the knife and fork and spoon at table the undue prominence of the biceps in

the necessary adjustments is noticeable. It is not a deficiency in crude strength that makes the child incapable; he is simply unable to use properly what he possesses in the management of a complex mechanism. His force is not rightly distributed and correlated throughout the parts of the whole apparatus employed.

A child of four or five years endeavoring to use tools illustrates the principle of development under consideration. S. at three can put a good deal of force into his experiments with a hammer, but he cannot hit a nail on the head once in ten trials. He must be watched by his elders when he is pounding to see that he does not bruise his fingers. V. at five has much greater precision, though compared with H. at eight he is still crude and clumsy; so much so, indeed, that the older one often makes merry at his expense, and he in turn rallies his younger brother. When S. is permitted to wind a watch, he puts more force into the act than is required. Also when he attempts to imitate H. in her painting lessons he apparently thinks the thing to do is to put all the muscle he can into the manipulation of the brush; he is a mere dauber because of his lack of adjustment of force to the task to be performed. H. shows considerable delicacy in her use of the brush, but still her work very patently lacks the fine touch which is made possible through the more perfect coördinations of her teacher. When H. attempts to do very fine work, one result is seen in marked tension of fingers and constraint of muscles in the face and the whole body. H.'s teacher, though, handles the brush for long periods every day with great ease and apparently with little fatigue. Experiments relating to the development of precision establish the principle that throughout the maturing process there is continual improvement, except for an apparent temporary arrest at puberty, in the ability to control the motor mechanism so that tasks requiring exact control and precision can be performed more and more satisfactorily as the years go on.

What has been said regarding the development of coördination in the upper limbs applies in principle to the development of the lower limbs. At the start the legs are kept in a tense position with the soleus muscles strongly energized. The movements are automatic, and in a plane up and down, as Perez, Trettien and others have observed. Development progresses outward here as it does in the arm and hand.

The development of pedal control

FIG. 20. — Tasks such as are shown in the picture do not require highly coördinated activities. (See exercise 13, page 331.)

In their first essays at walking children use their legs as if they were jointless. There is little if any flexion or coördination of the different segments with one another. Rigidity is the word that describes these early movements. It appears impossible for the child to energize both fundamental and accessory muscles in sequence as they are required in order to execute the complex act of walking in the most economical and

effective manner. This phenomenon is seen again when a young child attempts to kick a football. At first the toe is moved as though it were at the end of a pole; the limb is swung as an unsegmented whole, and in this way the toe is brought in contact with the object.

Turning now to the development of coördination in speech, we find the same general plan followed. The infant's first sound contains but a note or two, as *ă* or possibly *ăü*. These notes can be produced with comparatively slight coördination of the vocal mechanism. The cords must be tightened up a bit and the expired air directed upon them; but the infant cannot modify the current of sound thus produced, nor can he even modify the pitch or quality of the current itself. His repertoire is limited to a vowel note or two. But by the time he has attained his fifth month he has made some progress toward extending his range of vowel production. There are beginning to appear also certain consonantal sounds, those made by the lips acting on the current of sound. Most observers have found that the consonants denoted by *m*, *p*, *b* and *d* are the earliest to be executed, but in the very beginning even these consonants are not produced in a clear-cut, distinct way.

The development of coördination in speech

When the child begins to imitate the language he hears about him, he reproduces the simplest sounds first, those easiest made; and speaking generally, he comes last of all to those combinations that demand the most difficult coördinations. A long combination requiring for its execution the skillful manipulation of the vocal mechanism will either be left until very late, or it will be mutilated, often beyond recognition. The simplest element in it will be picked out and reproduced; or easy combinations will be substituted for the difficult ones. Thus, *what* will be reproduced as *hä; here*, as *hē; nail*, as *nā; this*, as *dĭɣ; there*, as *dā; that*, as *dăɣ;* and so on. For *where is that?* the child

says *fā dăt?* for *noise*, he says *noi;* for *Harriet*, he says *Häwi*. This is the type of very much that is found in children's use of words. The principle is seen again in the pronunciation of a word like *some*. The child makes it *shûm*. The motor process required to produce *sh* before *u* is simple as compared with that required to produce *s* in *some*. So again *horse* becomes *horshie*, *apple* becomes *appŭ*, *get* becomes *geh*, *farther* becomes *fädy*, *basket* becomes *băky*, *university* becomes *ūvŭty*, and so on *ad libitum*.

In the beginning the child universally omits *ll*'s on the end of words, as when *ball* is made *bäbä*, *tell* becomes *teh; fall*, *fä*, and the like. Again, the sound denoted by *r* is very frequently omitted, as when *broken* becomes *bōken*, *rock* becomes *ŏk*, *for* becomes *fäh*, etc. *Th* is quite universally omitted from words like *that* and *this*. *Ng* is always omitted. When the following combinations are followed by other sounds, they are almost universally omitted or something put in their place, — *st*, *ck*, *nd*, *rd*, *sk*, *ok*, *ru*, *ough*, *fe*, *ft*, *fr*, *th*, *ve*, *nk*, *ght*, *fl* and others of like character. Further, certain sounds are omitted when they occur in combinations at the beginning or the end of a word which makes their production difficult, though they may be pronounced in the middle parts of words.

The principle of development here in question is further illustrated when the child has learned the use of some words and has begun to construct sentences. If several words apply to different objects that have some common resemblance, he will choose the easiest word for them all. For instance, he says "*suppy*" for *breakfast*, *dinner*, and *supper*. Again, he will omit words that will make his coördinations intricate. "*Mamma, fä go?*" means "Mamma, where are you going?" and these instances are typical of much of the child's linguistic activity during the first three or four years. Of course, children differ greatly in

The principle illustrated in the child's use of sentences

the rapidity with which complex coördinations are attained, but they must all pass along the same route, though at different rates of speed. S. was as far along in the mastery of language difficulties at twenty-one months as V. or M. were at three and one-half years, but he seemed not to skip any of the stages; he simply ran the course faster.

The order of losing coördinations in degeneration

While the evolution of coördination proceeds from the simple and fundamental to the complex and accessory, in dissolution just the reverse course is pursued. Disturbances of coördination are first manifested in the finest and most complex movements. Mercier has pointed out that the most complex and elaborate processes fail first and the most fundamental remain to the last. Wilson has called attention to this in discussing the phenomena occurring in alcoholic dissolution. Degeneration begins with the highest, most coördinated movements of expression,— with purposive movements, — and travels downward to those which are automatic. The voice becomes shaky, and control over the tongue and lips is gradually lost. The drunkard returns over the route he went up in the acquisition of speech, passing through in reverse order the stages of incoördination which he outgrew in childhood. "If the tremors descend to the limbs, they first invade the fingers (not the thumbs), spreading abroad till the whole hand shakes, and creeping up the arms. The lower limbs grow tremulous last of all, their movements being largely automatic." Mercier thus describes the process of general undoing under the influence of alcohol. Ribot, too, has emphasized this law of decay in will, whatever may be the cause, from the highest and most complex to the lowest and simplest; from the unstable and most organized to the stable and least organized. Degeneration pursues a course directly the reverse of development; it is a continuous retrogression from the highly to the relatively slightly coördinated movements.

FIG. 21. — Varying degrees of coördination are required in performing the different tasks shown in the illustration. (See exercise 14, page 331.)

In senescent dissolution the finer and more complex activities are the earliest to become affected. The first evidence of a motor character of the oncoming of senescence is seen in a lack of precise control of the fingers. The old man becomes shaky in his writing. Then his articulation becomes less precise. And as age proceeds the coördination of all the accessory members is gradually lost. But the vital functions may keep their vigor unabated. When the old man is wholly unable to care for himself he may still eat vigorously and enjoy his food. He has indeed returned to his second childhood. Again, in death from lack of nutrition of a person of any age dissolution proceeds from the extremities inward. One can observe cases of this sort where he can see a reversal step by step of the developmental processes, until the individual is brought back to the starting point, where all is gone but certain reflexes, as when an object is put into the palm of the hand it will be seized reflexly and carried to the mouth, — just such a phenomenon as may be seen in the newborn child.

CHAPTER VIII

THE DEVELOPMENT OF INHIBITION: THE NEUROLOGICAL AND PSYCHOLOGICAL VIEW

Children's lack of inhibition

It is a matter of everyday observation that the typical young child gives way easily to his impulses. His tears flow freely upon slight provocation; he becomes hilarious over mere trifles; he gabbles incessantly when he should maintain silence; he flies into a passion whenever he is obstructed in his undertakings; and one might mention a long list of similar excesses. The chief problem of most parents seems to be to repress these exuberant and often irritating expressions of the young. How frequently one hears a mother say of her boys and a teacher say of her young pupils, — "They will drive me to distraction!" Compared with ourselves our children seem uncontrolled, heedless, and even willful. A sensitive or easily disturbed adult or one who craves quiet may expect little peace or comfort in the company of children from two to ten, who have been indulged in their spontaneity. They will be continually striving to perform tasks of an inventive or original character or in emulation of their elders, for the accomplishment of which they lack size or strength or ingenuity, and they will use every means at their command to obtain help from those who can aid them. They will be running here and there, jumping, climbing, pounding, throwing, shouting, handling everything novel within reach, and teasing one another and every living thing from which they can secure lively reactions.

Aristotle tells us that the child craves exercise of all his powers, and the same view in substance is presented by Plutarch, Quintilian, Rousseau, Locke, Pestalozzi, Froebel, Spencer, and a host of modern writers such as Preyer, Dewey, Baldwin, Compayré, Sully, Hall, Moore and others. As Baldwin puts it,[1] ". . . the child acts, and act it must, on the first suggestion which has the faintest meaning in terms of its sensations of movement." Dresslar [2] presents the same view in different terms, — "External stimulus is immediately answered by motor activity, even though at first these responses are uncontrolled and purposeless." Bell kept a record of the activities of his two children for a single day, and speaking of the speech activity of his five-year-old child he says: [3] "When I counted the total number of words which the child had used (in one day), I was not surprised to find them footing up to 14,996. As to the other activities

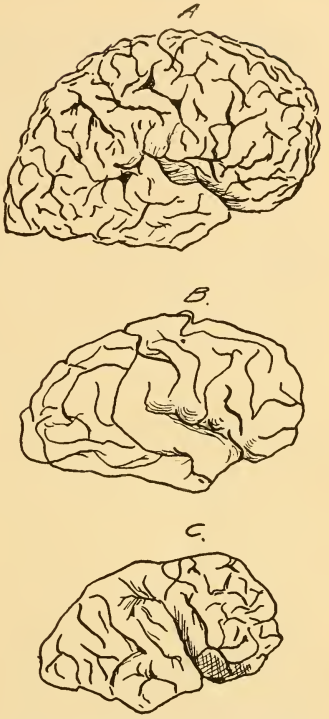

FIG. 22. — Side view of right cerebral hemisphere. *A*, normal adult; *B*, adult idiot; *C*, new-born child. (From Mercier's *Sanity and Insanity*.) (See exercise 11, page 339.)

[1] *Mental Development, Methods and Processes*, p. 5.
[2] Ped. Sem., Dec., 1901.
[3] Independent, Vol. 55, p. 911.

involved in the day's record, I wish to say that although I followed each child about the house, barn, yard, garden, sidewalk, across the street to a playmate's yard, swing, sandpile, etc., I went through fewer than one fifth of the number of movements of body, legs, arms, hands, feet, head, which the child under observation went through."

Recent popular literature concerning child life — such as Graham's "The Golden Age"; Nesbit's "The Would-Be-Goods" and "The Treasure Seekers"; Martin's "Emmy Lou, Her Heart and Her Book"; and poems and stories by Josephine Dodge Daskam, Stephen Crane, R. R. Gilson, Mary E. Freeman, Eden Phillpotts, Ruth McEnery Stuart, N. A. White, James Whitcomb Riley, Eugene Field, Rudyard Kipling, *et al.*, are full of references to the restless hands and feet and tongues of children. In "The Professor at the Breakfast Table" Holmes asks us to observe how the boy "loves to run, swim, kick football, turn somersaults, make faces, whittle, fish, tear his clothes, coast, skate, fire crackers, blow squash 'tooters,' cut his name on fences, read about Robinson Crusoe and Sindbad the Sailor, eat the widest-angled slice of pie and untold cakes and candies, crack nuts with his back teeth and bite out the better part of another boy's apple with his front ones, turn up coppers, 'stick' knives, call names, throw stones, knock off hats, set mousetraps, chalk doorsteps, 'cut behind' anything on wheels or runners, whistle through his teeth, 'holler' Fire! on slight evidence, run after soldiers, patronize an engine company, or, in his own words, 'Blow for tub No. 11.'" There is sound philosophy beneath the mirth of such pictures of child life as Hood presents in his "Ode to an Infant Son," Habberton in his "Helen's Babies," and others.

Shut a child in a room to keep him out of mischief, and if he has no opportunity to climb or to use the furniture for constructive purposes, or to use his hands in any way in making or

drawing or destroying, then his energies will escape through his vocal organs, or he will simply pound on the floor or walls or turn somersaults. Ask him to "sit perfectly still" and fold his arms. Try as hard as he may, he will nevertheless soon begin to move around in his seat, or swing his legs, or he will at least show unusual muscular tensions in his face and arms and body as a whole. When normal children are commanded to "sit perfectly still," automatic movements of head, face, eyes, hands, legs, mouth, and shoulders may often be noted after a few moments of effort. In the case of V. at six, some of these automatisms would appear after a brief period of attempting to restrain all motor activity. H. and S. could endure the tension for a longer time, but even they would show considerable disturbance after a few minutes of restraint. Curtis declares that children of four cannot inhibit all activity for the space of a minute; but older children can restrain themselves for a somewhat longer period.

The effect of motor restraint on mental activity

The motor character of the child's life is exhibited even in his sleep. One who will keep watch of a young child during the night will hardly fail to be impressed with the large amount of vocal and digital and bodily activity which will be observed. Curtis reports that above seventy-five per cent of those who made observations for him upon the restlessness of children during sleep detected movements of various sorts. The hands were kept in action, the limbs were held tense, there was a good deal of rolling over, finger twitching, opening and shutting of the mouth, moving of eyelids, sucking the thumb, and so on. These phenomena indicate how easily the nervous energy of the child finds its way to his muscles, even though the needs of adaptation at the moment do not call for motor activity.

When a young child cannot do anything in a motor way he will fall asleep. An adult might content himself, or at least busy himself, with *thinking*, but not so with a five- or six- or

seven-year-old child. "Before the teens is the time for action; after this will be the time for reflection" — so nature seems to say. One rarely detects children of tender age *deliberating* upon a situation; he always finds them active in a motor way with reference to it. By the age of ten — earlier in some cases and later in others — the tendency to reflect, which means to review one's experience with situations resembling that which now confronts one and which summons him to action of some sort,

FIG. 23. — A typical scene in the vicinity of a public school in any large city. (See exercise 5, page 333.)

begins to be manifested; and normally it continues to gain in prominence and importance until maturity is attained. Development means in part the gradual acquisition of power to inhibit original impulses and the tendency to react immediately upon the situations in which one is placed.

At the outset the child acts largely for the pleasure of action as an end in itself, though the desire to imitate, to excel, and the joy in being the cause of phenomena doubtless play a part in all his activities. When children begin to use a hammer, for instance, they merely pound, not with the aim of making anything in particular, or even hitting a nail. The satisfaction in

being able to direct the hammer upon a box or the floor is sufficient reward for the young novice. Try to induce a child of four, or so, to confine his pounding to driving nails, and it will be found that he is not ready for such specific and controlled activity. The aim of constructing an object, of *achieving a definite end in his action,* cannot yet control his spontaneity to any large extent. His muscles at this stage of development have a certain measure of independence and initiative; they have not yet become the obedient servants of the mind, as one might say. In the course of development, ends which the individual desires to attain will come to determine most or all his activities; mere spontaneous muscular action will become subordinate to ideas, but it is just the opposite at the start.

Restraint comes with development

One who has observed children develop must have noticed that as they proceed from infancy on toward maturity the period during which motor action may be and habitually is restrained is gradually increased. Of course, children differ in the rapidity with which they develop inhibition. V., a boy, is less restrained at seven than H., his sister, was at that age. The so-called motor type of person does not acquire inhibition as readily or as completely as the so-called sensory or mental type, a point which will receive attention further along. From the sixth or seventh year forward, children who have the opportunity to do so spend some part of their waking hours in hearing and reading stories and enjoying pictures; and they may even sit quietly in their seats in school and "learn their lessons." It is probable, though, that the mental states established by the stories they read or hear or the pictures they see tend to become expressed readily in appropriate action. The whole organism is doubtless affected in characteristic ways to some degree, at least by those parts of any story or picture that depict vital situations, regarded from the child's standpoint.

A situation would not be felt as vital if there were no organic and motor effects produced in contemplating it. As Fere[1] says, — the whole body "thinks" when the brain is in action. In the early years contemplation implies more than seeing or hearing or imaging in a strict sense; it implies that the child gains an appreciation of what the eye and ear give and what images mean because of certain organic and motor accompaniments. In telling H., during her fifth year, the story of Bluebeard, her respiration was always affected at the tragical moments. Also her muscles became rigid when the place was reached where the door was opened into the secret closet, and she got a sight of the remains of the women who had been killed there. And this is typical of much that may be observed in childhood, if one will look for it. With development this organic and motor response, like so much else in child nature, becomes subdued, checked down, but it probably never wholly disappears. Even in adult life there seem to be remains at least of the earlier tendency toward organic and motor response to every situation which makes an impression upon the individual.

To stress the point mentioned in the last paragraph, — when children begin to appreciate a picture or interpret the language of a story they try to "act out" more or less completely what they see and hear. Tell a child of four or five the story of the Three Bears, and he will be likely to growl as he imagines they do; he will show you how Silver Hair ran, how the bears ate the porridge, and the like. So he will bark like the dogs in his stories, puff like the steam engines, run on all fours as the cats and other quadrupeds do, and so on at length. One could not mention a dog in any connection in the presence of S. when he had reached his nineteenth month without his barking and otherwise exhibiting the behavior of the animal as he had had experience with it, either actually or in the representations of his

[1] *Sensation et Mouvement*, p. 25.

elders. So any allusion to a steam engine would not fail to set his arms and legs and lungs in motion after the pattern of the engine, as he thought. It is probable that understanding or appreciation, if we may use these terms interchangeably for the present, always involves more or less complete reaction in the beginning; but with development the motor and organic processes in dealing with many familiar situations decline,

FIG. 24. — Girls as well as boys like to play vigorous competitive games. (See exercise 6, page 333.)

and the same is true of the distinct conscious processes. It is the rule that development secures abridgment or condensation of the detailed processes, intellectual, emotional, organic and motor, in all oft-repeated experiences.

It should be noted especially in this connection that when children make given reactions fairly easily, they seem not to be so eager to practice them as they were when they first tried to make them, except when the needs of adjustment demand them. As development proceeds, new interests are continually

appearing as vital functions mature and bodily powers increase, and these new interests, representing insistent desires and needs, prevent the attention from remaining on the old responses. Nervous energy is probably drawn into channels that represent newer reactions. It is worthy of remark that children from the second year on for several years will allow no one to relieve them of doing anything relatively novel which they can perform even in a very imperfect manner. They insist upon feeding themselves, dressing themselves, making their own playthings, opening all packages that come to the house, and so on. When any of these processes have become thoroughly familiar, however, there seems to be little or no desire on the part of the individual to continue to perform them. At seven or thereabouts he is willing to have some one button his shoes and clothing, cut his meat, run errands for him, and the like.

The neurological view of inhibition

Considered from the standpoint of nervous function, inhibition of an act is secured by using in other ways the attention and energy which are needed for its support. An individual will then gain the power to restrain impulses according as he acquires new ways of directing his attention and utilizing his energies. In the early years his range of interests and of imagery is closely limited to situations requiring motor response. He does not and probably cannot attend to situations which require the review and organization of images and idea-complexes before reaction can occur; that is, he does not *reflect*. A three-year-old's attention is confined almost entirely to situations of which motor action is an essential factor, and so he must respond in a motor way. A dog's attention is probably concerned with situations requiring quite direct motor response, and the same is true of all the lower animals — the lower the animal in the scale of intelligence, the more direct and uncomplicated the motor response to stimulation of any sort. The higher the animal in intelligence, the greater the

possibility of deflecting a stimulus from the direct route to motor reaction so that it will be modified or arrested by the results of experience. Thus a dog can be so trained that he will not take food from the table or bark at passers-by, and so on, though his inclination is to do these things.

Speaking neurologically again, — as the associative functions of the brain mature, any one impression becomes connected up with an ever-increasing body of experiences which reënforce or check its tendency to issue in action according as the outcome in the past has been agreeable or otherwise. In the beginning the child acts, and thinks afterwards; but with development these processes are turned around. Psychologically, this seems simple enough; the infant must act in order to gain a knowledge of the values of things, but as he discovers these values he uses his knowledge to guide his future action. Conduct, then, must be precipitous, impulsive, unrestrained at the outset, else the child would never act at all. Control must follow and grow out of spontaneity. Muscles must dominate in the early years in order that the later ones may be characterized by deliberate, purposeful, controlled action.

The principle to be impressed is that the less elaborate the intellectual processes the greater the likelihood that any stimulation will run directly into motor channels; while the more elaborate the intellectual processes the more completely will stimulations be checked or inhibited. This means that an animal or a person that can retain the results of experience will develop the power of inhibition to some extent, while one that cannot retain experience cannot acquire inhibition in any degree. An idiot can retain experience only to a slight extent, and so he can acquire only a very low degree of inhibition. Nature men are not so restrained as men of culture because they cannot retain as wide a range and variety of experience, and such experiences as they can retain are not so fully organized, so that

they cannot reënforce or check one another, as is the case with more advanced peoples.

This implies on the intellectual side that one can entertain ideas that do not relate directly and immediately to situations demanding motor reaction. A philosopher, for example, attends so constantly to "abstract" matters, matters that do not concern his immediate interests or welfare in any way, that motor activity is largely inhibited, at least for long periods at a time;

FIG. 25. — A typical scene in a children's indoor game room. (See exercise 6, page 333.)

though in the end it is probable his reflections may issue in appropriate action. It is possible that some men may spend their lives in reflection, and others, perhaps their descendants, at any rate not themselves, may be guided by their reflections. Plato, Aristotle, Kant and Hegel were probably less influenced themselves in their conduct by their own reflections than have been some of the generations since their time. The social organism is so constituted that some of its members may give themselves to reflection, while others put their conclusions into

execution. Doubtless the goal of all thinking is action; but it is not imperative for either individual or social well-being that the circle should be completed in any one individual life, or even in any one generation.

In what has been said thus far it has been the aim to show that in the earliest years motor activity is dominant, but as development proceeds the brakes are applied and by the time maturity is reached intellectual activity normally become ascendant. As intellectual complexity increases motor dominance decreases. In this connection it should be noted that in degeneracy there is descent over the route by which the individual ascended during his developmental course. The poise and control by which a mature person adjusts himself in happy relations to a complex environment are earliest lost in nervous disintegration. The effect is seen first in lessened restraint of motor action. The tongue is less restrained, for one thing. Then the egoistic impulses manifest themselves more readily in anger, in selfishness, in sensuousness, and the like. It is well known to alienists that a prominent effect of insanity is seen in the tendency of the patient to react upon situations without deliberation. Stimuli produce response so directly that experience counts for little, and impulse comes to the front again. Hall, in his study of anger, points out that irritability, one of the earlier effects of mental disturbance, is caused by the weakening of the inhibitory powers so that the victim becomes the creature of any morbid impulse which may be suggested. Some forms of insanity are characterized by this almost entire lack of inhibitory power, so that primitive and anti-social tendencies run riot in the individual's life.

Suggestions gained from the phenomena of degeneration

An interesting case cited by Bateman[1] shows that impressions made upon the nervous organism at one time may be kept from

[1] *Aphasia and the Localization of the Faculty of Speech*, p. 189.

motor realization through the inhibitory force of the environment; but in nervous disease, when inhibition is impaired, they may become manifest. "In a town in Germany," he says, "a young woman of four or five and twenty, who could neither read nor write, was seized with a nervous fever, during which she continued incessantly talking Latin, Greek, and Hebrew, in very pompous tones, and with most distinct enunciation.

"The case had attracted the particular attention of a young physician, and by his statement many eminent physiologists and psychologists visited the town, and cross-examined the case on the spot. Sheets full of her ravings were taken down from her mouth, and were found to consist of sentences, coherent and intelligible each for itself, but with little or no connection with each other. Of the Hebrew a small portion only could be traced to the Bible, the remainder seemed to be in the rabbinical dialect.

"All tricks or conspiracy was out of the question; not only had the young woman been a harmless, simple creature, but she was evidently laboring under a nervous fever. Inquiries having been made as to the antecedents of this girl, it was ascertained that she had formerly lived as a servant to an old pastor, a very learned man, and a great Hebrew scholar. It had been the custom of this worthy divine to walk up and down a passage of his house into which the kitchen door opened, and to read to himself, with a loud voice, out of his favorite books, which consisted of rabbinical writings, together with several of the Greek and Latin fathers; from these works so many passages were identified with those taken down at the young woman's bedside that no doubt could remain concerning the true origin of the impressions made on her nervous system."

The phenomenon of descent from control and inhibition to a point where impulses manifest themselves unchecked is seen in inebriety, a form of temporary degeneracy. The typical

drunkard is irritable, petulant, peevish, and indeed has quite lost control of himself. He is exceedingly disagreeable to live with because he cannot properly control his egoistic emotions. He has lost the "virtues that make for peace and happiness." His power of attention is lessened; he cannot hold it persistently to any task — traits which are characteristic of the child. The drunkard is not reliable in his judgment; he is rash or timid in his enterprises; he is unable to "direct the balance of probabilities"; his actions are not adapted to the occasions which call them forth; he is, in short, reduced to the state of juvenility.

It is a matter of common observation, too, that self-control, as we say, is often lessened in fatigue. As in other forms of nervous disturbance, so in fatigue, the highest and most complex cerebral areas are first affected, and they lose their hold on the lower centers in which the primitive impulses originate. Most persons when overstrained are not "themselves"; now trifles annoy them and produce excessive reaction, when at other times they would be able to keep their attention on something more pleasing. Hot words usually come at such a time. When one is in good repair he can restrain himself because he can call to his aid many considerations which will keep the lower impulses in check.

CHAPTER IX

THE DEVELOPMENT OF INHIBITION: RESTRAINING FORCES

The perfectly restrained individual

A PERFECTLY restrained person would be one all of whose activities would be precisely adjusted to the social and physical situations in which he might be placed; he would neither be too greatly nor too slightly inhibited. To illustrate: young children laugh on all occasions when anything "funny" happens; but a properly restrained person would not laugh while attending a funeral, for instance, even if incongruous situations were presented. He would not engage in boisterous and unrestrained laughter on any occasion unless he found himself in a group in which the members were giving free rein to their mirthful feelings. On the other hand, he would not remain solemn in groups in which everyone but himself indulged in hilarity. By overchecking himself in respect to laughter he would become ill-adapted to the situations in which he was placed as fully as if he should go to excess in the other direction. In the same way he would not talk excessively when he was in groups where others wished to talk; neither would he remain speechless in such groups; one frequently sees persons who illustrate both types. So take any activity whatsoever; one would be well restrained in respect to it when he had it under such control that he could rein it in when necessary or let it go when circumstances so advised; but he would never give too great license to the activity nor would he unduly inhibit himself in regard to it.

Our question now is, — how does the child gain such control over his activities that on his own initiative he can regulate

them according to the demands of the situations in which he is placed? We have seen that when he is born he has an equipment of impulses which, while essential in his life, are nevertheless, as they tend to be spontaneously expressed, not well adjusted to present-day social and physical conditions. The individual's impulses were established in different circumstances from those which environ him to-day, and they must either be strengthened or checked down or perhaps completely eliminated in accordance with the requirements of present-day life. With a view to observing the experiences which a child must have in order to acquire restraint of an impulse, we may take a typical concrete instance.

Experiences which develop restraint

Every normal, untaught, two-year-old child is eager to secure immediately whatever attracts his attention when he is brought to the table. Suppose he sees sugar as soon as he is placed in his high chair. Nature seems to say to him, — "Get the sugar; it will give you pleasure," and it is certain that he will reach for it. But his parents decide that he must learn to restrain himself when he comes to the table; so they slap his hand, let us say, which is a method of training very often practiced by parents. Nature again seems to say to him: "When an object gives you pain pull away from it. If your hand is struck, withdraw it instantly." But after a few minutes, when the sting has become softened, the child looks at the sugar; the original impulse gains the right of way and he grabs again. His mother slaps him as before and he withdraws his hand. So the episode is repeated a half dozen times at this one meal. What is the situation at the close of the meal? The child has made some connection between reaching for the sugar and suffering pain, and he has withdrawn his hand every time when it has been struck.

The next day when he is brought to the table again it is practically certain that he will reach for the sugar. The mother slaps his hand and he reacts as he did at the previous meal.

Several times during this meal he grabs, suffers pain and withdraws his hand. This program is followed at every meal for a month, and every time the child has the experience the connection between grabbing and suffering pain therefrom is strengthened, provided that the distress experienced means more to him than the pleasure he derives from securing the sugar. If he would rather have the sugar and take the pain with it, then he may establish some connection between grabbing and its consequences, but he will not be restrained because the pleasure which the sugar yields is so strong that the discomfort attending the securing of it will not inhibit grabbing for it. Normally, though, repeated painful experiences will in time arrest the actions on account of which the pain is suffered.

Stages in acquiring restraint

One can observe a child's progress in acquiring self-restraint in respect to this particular act. There is a stage in the learning process when the child's hand will be extended toward the sugar but will be withdrawn before the act is completed; the impulse to grab functions reflexly and so gets started before the painful experience is awakened to control it. There is another stage in the learning process when the child will hesitate for a number of seconds between grabbing and restraining himself; there is apparently a struggle between the impulse and the consequence of giving rein to it. But in time, if there be no intermission in the learning process, the hand will not be extended at all; the restraining effect of the painful experience becomes dominant. And after repeated and unfailing restraint of the act of grabbing, the dynamic force of the impulse to grab appears to become diminished. It is improbable, though, that the impulse ever wholly disappears. Adult university students have testified that often they feel a strong impulse to reach for what attracts them at the table, and they are frequently aware of making a conscious effort to restrain themselves. Many adults have confessed that when

no one is present at table they do grab for sugar or doughnuts or apples or some other tasty article.

There are other forces than physical coercion which will lead to restraint of any impulse like grabbing for objects that give pleasure. Take the child mentioned above who is learning not to grab for sugar. Instead of slapping him when he offends, his mother now pushes him away from the table, or takes him down from his high chair and locks him in a room. Every time he grabs this penalty is applied. It operates in precisely the same manner fundamentally as slapping does, only it will probably restrain the grabbing activity more quickly than slapping because of the long-continued impression which it makes upon the learner. The effect of slapping the hand lasts in the beginning only while the dermal pain endures, though with constant repetition the experience becomes permanent and continues from one day or week or month to another. But when a child is put away from the table the painful experience lasts for a considerable period at the very beginning and every time it is repeated.

Physical coercion not the only force that leads to restraint

There are still other methods of checking the impulse to grab. The mother does not slap the child or put him away from the table when he grabs, but instead she speaks to or looks at him sharply. Nature seems to say to a two-year-old child: "When anyone speaks to you in a harsh voice or looks at you threateningly cease the action in which you are engaged. Protect yourself." Every time the child grabs, the mother warns him with a look and in a threatening tone, and the effect upon him is much the same in relation to the restraint of the original impulse as if she had slapped him or denied him his meal. But a counteracting effect is likely to set in with respect to this mode of controlling the impulse. When a child first hears a harsh voice or sees a stern face he is terrified, but when upon constant repetition no other harm than fear comes to him the fear gradually subsides,

and in time the child is likely to become immune to the harsh voice or look. One can see children five or six or seven years of age, sometimes still younger, who have become callous to even the harshest tones or looks of father or mother, though at the outset they were much impressed and were restrained in the performance of the activities which occasioned the harshness.

With an older individual — in youth or adult life — a harsh voice and condemning expression on the features of the parent or the teacher will normally exert a stronger restraining influence than with a two-year-old child, for the reason that in youth and maturity the approval or disapproval of one's parents, teachers or other persons is the most potent force in determining one's behavior. The two-year-old child will respond actively to vocal and featural expression principally because they are indices of dynamic attitudes on the part of the parents or governess or older brother or sister; but the fifteen-year-old child will be governed by vocal and featural expression mainly because in this way he gains a cue as to how he is regarded by his parents and others. Normally he now desires the good-will and esteem of those about him, and he is affected by any sign which indicates that they are condemning him for his actions. Good-will and approval as such have no significance or value for a year-old child; but they have profound meaning and value for an eighteen-year-old person, and their importance and so their restraining influence increase steadily until full maturity is attained. So it is inevitable that as the child develops into and through adolescence the expressions of disapproval of the people around him for his behavior at table should play a constantly more dominating rôle in building restraints against impulses which lead him into conflict with existing conventions.

Restraining influences operate differently at various stages in development

There are still other restraining forces that play upon the child and coöperate in holding his impulses in check. As he

develops he pays more and more attention to the behavior of those around him, and he imitates the activities of the people with whom he associates. While he imitates principally positive actions rather than inhibitions, he nevertheless does begin to notice inhibitions by the age of six, at any rate. It is true that his impulses are so urgent at the age of four or five that even when he notes that his father and mother and brothers and sisters and guests do not grab at table, his discovery does not exercise a controlling influence over his impulse. But he does notice, that is the point; and his observations make a deeper and deeper impression as he increases in age, because normally he tends to become like the people with whom he associates. His impulse to grab at table might in time be checked simply by the observation that others about him do not grab; but one rarely if ever sees a child who has not been influenced by many other forces, all of which unite to reënforce his wish to behave at table the way the people around him do.

Imitation of self-restraint in others

The influence of imitation in developing self-restraint applies to one's reading as well as his observation of persons in the flesh. A boy, let us say, reads stories concerning heroes whom he would like to copy. Among their other characteristics they behave at table. When the child's impulse to grab asserts itself, the heroes in his stories will tend to come forward and condemn him. One can note the influence of heroes in stories upon the conduct of children from the fifth or sixth year on; when they are told stories at this age the characters will exert a strong influence provided that they seem to be everyday persons like the learners; but if they appear to be far removed from everyday situations, they will exert little or no influence upon the impulses of the listeners. Taken as a whole, the stories told to children and read by them as they grow older function in their lives as re-

The restraining influence of heroes in stories

straining forces to a greater or less degree, — less in the earlier and greater in the later years.

We have not mentioned all the forces that normally play upon an individual and operate to develop restraint of such an impulse as we have been considering, but we have gone far enough to suggest what might be called the natural history of a typical act of self-restraint. Now, these forces of everyday experience fuse together and exert a joint influence as development proceeds, until in the end any individual factor, though it may have exerted an influence separately in the beginning, ordinarily cannot be distinguished in its origin or influence from the others. The impulse to grab at table is restrained in the man, but he cannot tell as a rule just how restraint has been developed. The combined effect of all these forces is felt by him to be an act of volition, performed in view of his conception of what is right in the circumstances. It would be in accord with present-day psychology to say that the restraining forces which have put a check to the grabbing impulse gradually withdraw to the outer limits or to the lower strata of consciousness according as they establish a habit of restraint, which in reality means that they hold an impulse in leash until a new act in accord with the requirements of the environment has been established in the place of the impulsive act. In due course this new act acquires such facility or momentum or value that it can be depended upon to occur in the place of the impulse which it is designed to replace. But while the factors that have exerted the restraining influence throughout the formative years disappear from focal attention, they still remain on guard marginally so long as the individual retains nervous poise and vigor. If the original impulse should become insurgent in a normal eighteen-year-old person and he should start to grab at table again, one or more or all of these restraining forces would be likely to come forward and exert an inhibitory influence. This would not be

The fusion of restraining forces

the case if the individual should become drunk or mentally degenerate or even nervously exhausted. Under these latter conditions native impulses are stronger than the learned acts which should restrain them. Degenerate persons are apt to be controlled by impulse much as they were in infancy.

We have yet to mention an important factor in the restraint of impulse. Still keeping to our typical concrete instance of grabbing for sugar, the time may come in the individual's development when the original appetite for sugar becomes less aggressive. He may have been made ill by it; or he may have heard it said that sugar was "bad for the wind" and he wishes to avoid experiences which will prevent him from out-running or out-playing his rivals. If one or more of these factors or others like them have come into his life, the impulse to grab sugar may lose some of its dynamic force. Nature will no longer say in effect to the individual: "Grab for sugar whenever you get a chance because it will give you pleasure." On the contrary she will say: "Let sugar alone because you will not like it or you will not be as efficient if you eat it." Doubtless every reader can think of many instances illustrating this principle in respect to some of his own acts of self-restraint. He may have lost his taste for certain foods or drinks, or his love of certain games or pastimes, or his interest in certain activities, as dancing or climbing trees or boxing, and so they do not appeal to him. Once they may have been exceedingly urgent and he may have given way to them, but he has become restrained with respect to them simply because they do not urge indulgence upon him.

The weakening of an impulse

We should now consider the rôle played by formal education in holding in check impulses which if indulged would bring the individual into hostility with his social or physical environment. Will the study of arithmetic help to check the impulse to grab for food at the table? In order to see if the study of arith-

metic would exert any checking influence on a child's grabbing, let us assume that no other restraining force whatsoever would play upon him in controlling this impulse. He comes up to the age of seven or eight wholly unrestrained in respect to grabbing and he spends forty minutes each day learning arithmetical rules and solving problems. Will this experience play down upon the impulse in any manner or degree? It is impossible to see that there would be any direct connection established between the facts of arithmetic and the impulse to be controlled; but it is probable that the attention given daily to arithmetic would to some extent divert attention from sweets and so weaken the tendency to secure them. Presumably, the nervous energy which would sustain the impulse to grab for sugar if the individual gave no attention to anything else would be at least slightly reduced if a half hour every day were spent in solving arithmetical problems. Our conception of brain function warrants the view that experience in solving problems results in the development of cerebral areas remote from the areas concerned with the gratification of physical appetite. If this be true it follows that the study of arithmetic will make demands upon attention and nervous energy which otherwise might be devoted to the original impulse to indulge appetite. Also the individual who spends a half hour each day in the study of arithmetic will not be so precipitate in acting in the direction of his impulses as he would be if he had no arithmetical experience; the latter experience will check impulse by distributing to some extent the attention which in an individual who has had no study like arithmetic will be centered wholly upon his impulses.

The rôle of formal education in developing restraint

If now we add to the study of arithmetic the study of history, English literature, reading, music, drawing, geography and manual training, each receiving a half hour of the child's time and energy each day, we can say unhesitatingly that even if no

impressions are made in any one of these subjects which are directly connected with the impulse to grab food, there will nevertheless be such distribution of attention and energy over a great variety of interests that the original impulse can hardly function with such vigor and persistence as it did at the outset, and as it would continue to do if the individual should study none of these subjects. An illustration is found in the case of the imbecile who is unable to pursue any of the studies mentioned. To the end of his days his impulses retain their original vigor. He will grab for sugar on his twentieth birthday in much the same unrestrained way that he did on his second or third birthday. Psychology, neurological theory and experience all alike support the view that study in any field tends in some small degree at least to subdue original impulses by diverting attention and energy from their support.

There are further results of study in certain subjects which operate to check original impulses. In the study of history and literature, for instance, the pupil would probably gain impressions which would operate directly to check impulses concerned with self-indulgence. The gourmand would be held up to scorn and ridicule; animal appetite would be condemned; restraint of selfish indulgence would be exalted. No word might be said relating directly to the grabbing of food, but the general ideal of checking greed and piggishness would be strengthened, and the individual would probably make some connection between the ideal and particular forms of indulgent action. Of course, the extent to which anything taught in history, literature and similar subjects will play down upon and check impulses will depend upon the character of the impressions established by these studies. If in history a pupil should be concerned mainly with learning dates and isolated events connected therewith, and if in literature he should study only the names

The influence of ideals established in history, literature, et al.

of authors and the titles of their works, there could be very little direct and even very little indirect influence exerted upon the pupil's impulses either to overeat or overdance or cheat in his examinations or use profane language and so on. But, on the other hand, if the pupil should study history as a story of how men have lived in the past, what their problems have been, how they have solved them, what ideals have been held by the peoples who have progressed and grown strong in the course of time; and if in literature the pupil should gain vivid pictures of characters who are placed in situations similar to those in which he is placed, and they have solved problems of behavior which confront him, and if these characters make a strong appeal to him because of their courage or cleverness or resourcefulness, — then all these ideals and impressions will tend to play down upon his indulgent impulses and restrain them.

The restraining influence of habits established by study

Formal education exerts a still further influence in checking original impulses which deserves mention. If a pupil spends five hours a day working over books or with tools or physical or chemical apparatus, he tends to acquire attitudes and habits which as he goes on will more and more determine his general behavior. The daily exercise in solving problems or performing experiments or making objects gradually gives the organism a set in the direction of these activities and away from the attitudes involved in running, yelling, throwing, playing with dolls, playing marbles, and so on. The reader will doubtless ask at this point: "Why is it that pupils who spend four or five hours a day in school activities do play with dolls and marbles, and do run and jump and climb and yell and throw stones and dance, and all the rest?" The answer is that the more often they perform the school activities the less persistently and violently they perform the impulsive activities. If a child would

normally remain in the combative period for fifteen years provided he had no formal educational experience, he would remain in the period a shorter time and the combative tendency would be less urgent if he should spend four or five hours a day continuously throughout the period solving problems of one kind or another, or working with tools and performing laboratory experiments. As a matter of fact, the "scrapping" period is materially shortened through the establishment of other and different attitudes induced by the activities of the school. The principle is illustrated in the completeness with which most university instructors have abandoned many of the activities ordinarily indulged in by men of their age. When an instructor spends from eight to ten hours a day in linguistic, scientific, mathematical or psychological studies, the attitudes essential for success in these pursuits come to be habitual with him until presently his whole life becomes planned and expressed to a greater or less extent in harmony with these attitudes. The educated man, then, would not be so likely to go to excess in eating or drinking or fighting or licentiousness of any kind as the uneducated man, even if his education did not give him any specific impressions or ideas relating to restraint of impulses. The attitudes necessary to be assumed in acquiring an education of any kind would in some degree inhibit indulgence and dissipation.

Individual differences in the matter of self-restraint

We may now ask why it is that individuals who apparently have substantially the same native equipment and vigor of impulses and the same general experience and educational training differ so greatly in the readiness and completeness with which they acquire self-restraint. A typical concrete instance will bring the problem before us. J. is seventeen years of age and F., his brother, is fifteen. The older boy is in "hot water" a considerable part of the time. He offends the people around him by his slangy

talk, his immoderate laughter, and his lack of sensitiveness to the interests of others. He habitually overeats; he stays out late at night, though incessantly urged by his parents to keep reasonable hours. He has always been a source of trouble to his teachers because he likes to "start something." He has broken all his limbs at one time or another because he does "dare-devil tricks," — to use his father's phrasing. It has been difficult to keep him in clothes because he uses them so roughly that they are always ragged.

His brother, two years younger, is the opposite in practically every respect. F. has already gone beyond J. in his school work. He is the favorite of his family and of his teachers because of his self-control, his thoughtfulness, and his geniality. J.'s teachers have never taken a fancy to him and even his companions do not care greatly for him because he is incessantly playing practical jokes on them; but everyone apparently likes his brother.

Why should one boy be so much more self-restrained than the other? First; the older boy is not sensitive to the attitude of people toward him, — either his parents or his teachers or his playmates. He often says he does not care what people say about him, and his actions give effect to his words. If a teacher scolds him he is not humiliated. He has often been heard to say that he would rather be "bawled out" by the teacher than praised. He has substantially the same attitude toward his companions; it seems to make no impression upon him if he loses one of them. He even has the same indifferent attitude toward his parents. He rarely does anything to show that he wishes to please them or earn their good-will.

He is what might perhaps be called a sensuous type. He likes food better than he does the esteem and confidence of those about him. He has a superabundance of physical energy and apparently he does not keenly feel that the good-will of anyone

would be of value to him. It is as though nature said to him: "You can hold your own no matter whether anyone likes you or not. Pay no attention to their words or their deeds in reaction upon your expressions. Gratify your appetite, do whatever pleases you at the moment, and give no heed to the responses of the people who are affected by your actions." So in reality he does not care, and consequently he does not gain impressions which will restrain impulses that when indulged alienate him from his associates. He has not developed self-restraint in a high degree because he seems to get more out of life by not exercising self-restraint.

His brother, on the contrary, is very sensitive to the attitudes of persons in reaction upon his conduct. If he should be chided by a parent or teacher it would wound him deeply, whereas chiding bounds off his brother's ego without leaving a dent. The younger boy delights in standing high in his school work. A grade of *Excellent* gives him pleasure, while a grade of *Poor* would distress him. The older boy makes no distinction between *Excellent* and *Poor*. J. has had to be constantly warned that if he would not attend to his work he would be dismissed from school, and this has served only to stimulate him sufficiently to avert the threatened tragedy; he would rather stay in school than to go out in the world and earn his living. The younger boy applies himself to his studies partly because he enjoys intellectual activity and partly because by doing high-grade work he secures the good-will of his teacher and his parents and the admiration of his classmates. He is a socially sensitive type as compared with his brother, and the difference is unquestionably one of original constitution. The younger boy cares more than his brother not only for the good-will and esteem of people, but he cares more also for good health. He avoids experiences which he thinks will lower his vitality or injure his body as a whole or any of its members. The older boy is indifferent to

health, and so there is no check to his excess in gratifying appetite or extremes in his athletic activities. He plunges headlong into everything he does because there are few restraining considerations which seem to him to be of value, while just the opposite is the case with his brother.

CHAPTER X

ACTIVITIES PECULIAR TO ADOLESCENCE

Transformations occur abruptly during puberty

It was stated in preceding chapters that for the most part developmental changes occur gradually; new interests and activities make their appearance, reach their climax and subside or disappear very slowly rather than precipitately. It is true that the developmental process, regarded as a whole, consists of a series of metamorphoses; but one must observe any interest or activity closely and for a considerable period in order to detect the transformations which take place. Possible exceptions to this principle are found when the child begins to grasp at objects at about the fourth month and to walk and to talk at about the twelfth month. These accomplishments enlarge his range of experience and increase his power of communication so greatly that abrupt changes in his interests and in his intellectual and emotional activities may be noted. But the most marked exception to the rule of gradual transformation in development occurs in the early years of the adolescent period. The years between eleven or twelve and sixteen or seventeen may properly be regarded as constituting a genuine epoch in human development. One can almost see important metamorphoses taking place at this time; within the space of a few weeks often one may note conspicuous physical as well as intellectual and temperamental changes.

All observers have called attention to the very rapid increase first in height and a little later in weight of both boys and girls

between the ages of eleven and sixteen. Normally a girl gains from two to four times as much in height and in weight between the ages of eleven and fourteen as she did in any preceding three years except the first three. The boy gains from two to five times as much in height and in weight between his twelfth and his fifteenth year as he did in any preceding period except the first three years. Even untrained observers frequently comment on the abrupt transformations that take place during this period in the appearance of the features, in the proportional relations of the bodily members, in the voice, and in the individual's interests and behavior. Parents who are with their children constantly during this transition period often remark upon the rapidity of the changes which occur right under their eye. The features are remodeled so swiftly that it is frequently difficult to recognize a boy or a girl when one has not seen him or her for six months. And these changes which can be observed with the naked eye, so to speak, are no less profound than are the developments which take place internally. The respiratory sys-

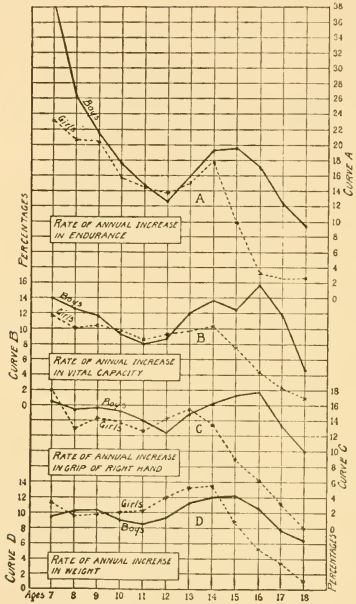

FIG. 26. — Curves showing the rate of annual increase in endurance, vital capacity, weight and grip of right hand. (See exercise 6, page 345.)

tem, the digestive system, the muscular system and particularly the nervous system undergo metamorphoses much as do the features or the voice.

These familiar phenomena of puberty are mentioned by way of introduction to the transformations which occur in the interests and activities of boys and girls during early adolescence. At the onset of this epoch the individual feels a craving for association with members of his own sex and persons of his own age and stage of development. The boy longs at this time to become a member of a group which has a leader and some form of organization. Usually there are secrets which are imposed upon all the members of the group. Loyalty on the part of each member to the group as a whole is the fundamental requirement for continued membership. Instinctively these boy groups feel that their activities will be hostile to the rules and conventions of the community in which they operate, and so the first requirement of membership is the sacrifice if need be of individual interest and welfare for the protection and perpetuity of the group. When the group has been found guilty of any misdemeanor, as stealing or breaking into houses or setting fire to buildings, and one member is caught, he must endure severe pains and penalties rather than divulge the names of his "pals" or reveal the purposes and secrets of the organization. All boys from thirteen to fifteen or sixteen years of age normally belong to gangs if there are a sufficient number of boys in the community who are passing through the gang-forming period. And a boy who is a member of a gang is more confidential with his comrades than he is with his father, mother, brothers or sisters. He feels that his interests can be gratified more fully by the aid of the gang than of the home, the school or the church; these latter institutions tend either directly or indirectly to suppress the activities in which he is principally interested.

Boys form gangs

The boy is at this time interested chiefly in tribal activities. His remote ancestors hunted and fished for a livelihood; but he hunts and fishes for "sport." With pride he displays the product of his hunting and fishing as evidence of his cunning and skill in woodcraft and seacraft. The boy finds but little pleasure in hunting and fishing alone. These are coöperative activities. If the gang would not hunt or fish the individual boy would not persist in it.

The boy is interested in tribal activities

There are other activities in which the gang indulges that resemble the enterprises of remote times. Gangs like to wander through the woods and start up wild life or pry into unusual situations of any kind. They take delight in robbing birds' nests and in building fires in the woods. They like to go into the fields or on the banks of a stream or in the woods and make a camp, cook their food over a camp fire, and tell and listen to stories of adventure and daring. For the time being they are nature men in their interests and their activities. But they exhibit these traits in the gang only. Break up the gang and the individual boy's interests in tribal activities will practically disappear. He will not go off by himself and make a camp or wander through the woods; on the contrary he will stay near his home as though he felt the need of close companionship with someone. As a member of a gang he will manifest but little interest in reading unless it be stories of adventure and combat. He will not be interested in quiet games. The members of a gang rarely if ever play checkers, "authors" or similar games; but when a boy is separated from the gang he will often enjoy reading and quiet games. As an individual the adolescent's interests will be mainly in accord with the requirements of present-day life; but as a member of a gang his impulses will lead him back into earlier modes of life. A boy in the early teens can easily adapt himself to the restraints and conventions

The boy's tribal interests will flourish only in the gang

of his social environment when his primitive impulses are not stimulated by membership in a gang. In his study of mob psychology LeBon found what many observers have noted, — that when an individual is in a crowd his tribal impulses tend to gain mastery over activities suggested by and adapted to his immediate environment. A cultivated man will sometimes be guilty of acts in a crowd which he could effectively restrain when alone. A mob is usually dominated by primitive interests; those who are responsible for preserving the peace on the streets of a town or city or in a schoolhouse or on a playground understand this very well.

A boy will be more completely weaned from his immediate environment if he is associated with twenty-five boys in a gang, all of whom are in the same period of development as himself, than if there are only three boys. It requires large numbers fully to counteract the influence of an environment which tends to repress primitive impulses. The adolescent boy is responsive on the one side to promptings that have come from remote times, and on the other side to constant suggestion from his present-day environment. All that the boy hears in the home, in the school and in the church impresses the importance of being courteous, of inhibiting profane and obscene language, of being cleanly, of utilizing his time so as to improve his mind, of not disturbing others who are attending to their own affairs, of not destroying property or taking the possessions of others, and so on. Wherever he goes he sees and hears these lessons repeated and they constitute barriers in the way of indulging his impulses. But when he is with his gang he forgets the lessons impressed upon him in home, school and church because his primitive actions are indorsed now instead of condemned and opposed. He stands well with the gang when he is completely primitive. Gangs usually have initiation ceremonies which stress the value

The larger the gang the more tribal its interests

of tribal qualities. A boy is often not admitted to membership in a gang unless he has to his credit several thefts, unless he can swear fluently, unless he can smoke and often unless he can chew tobacco. Also he must prove that he has muscular strength and endurance and courage. When the gang is in conflict with organized society its members must all have good stuff in them or else the gang will break up or be broken up, and the individual members may suffer because of the weakness of any one member.

The gang promotes pugnacity

The primitive character of gang activities is revealed in nothing more strikingly than in the importance attached to prowess in physical contests, — in fighting, wrestling, "scuffling," "plaguing" people, and so on. A boy in order to become a member of a gang must above everything else be a good fighter. He must be ready to defend himself at the drop of the hat, no matter who his assailant may be. If he is struck and if he knows that he will be severely damaged if he strikes back, he must nevertheless "stand up for his rights." The reader will of course recognize that this is a fundamental trait of primitive man; physical survival required that early man should both resent and resist the aggression of anyone, weak or powerful.

Usually one gang in a town or city will deliberately plan combats with other gangs; the existence of a gang anywhere in a community is a challenge to all the other gangs. Eliminate wholly the factor of combat and a gang would tend to disintegrate, unless it should be engaged in migratory or predatory activities. If there is no group with which a gang can engage in warfare, then the individuals of the gang will fight among themselves. When there is an enemy at the gates they will all hang together, but when there is no danger from without they will break up into cliques.

There never was a gang probably in which there was not constant wrestling and "scuffling" when the members were not

engaged in other absorbing pursuits. If a boy is within arm's reach of another boy he is a constant challenge for muscular contest of some sort. It is rare to have a group of boys in the early teens together for ten minutes at a time without physical contests of some kind developing among them. The only way to prevent such contests is to capture the attention of the boys so that their energies will be diverted from their muscles, and so that they will not be conscious of the presence of boys near them.

Muscular contests

It was intimated above that the activities of the typical gang are in considerable part in conflict with the rules, regulations, conventions and institutions of organized society. One is impressed with this fact when he notes the extent to which gangs make depredations upon property and annoy and hector people who do them no harm. Practically all gangs engage in stealing; the gang that can make the most daring thefts is envied by all other gangs that learn about it. It is impossible to tell in many instances whether goods are stolen because they are desired by the thieves or whether they are stolen for the sake of accomplishing a courageous feat. It is universally true that a member of a gang who makes a daring theft and is successful in it regards it as a very distinct accomplishment; he boasts about it; his fellows celebrate his courage and skill, and he is altogether a marked individual in the group. The records of juvenile courts show an almost endless variety of objects that gangs steal, — everything that is movable and that they stand a good chance of getting away with. If they pass a farm they will steal fruit or eggs, or catch chickens and wring their necks. They will steal tools, nails, leather straps, old pieces of iron, discarded wheels of carts, and so on at length. If they find a house vacant, but with furniture in it, they will force a door or a window and take everything they can carry away. In cities they will steal fruit from stands and peddlers'

Stealing

carts. They will go into stores, and while the clerks are not looking they will "snitch" anything they find loose. They will, of course, steal anything they can eat, such as candy or fruit or cakes and the like, more generally than other objects. Next they will steal firearms and then tools, and lastly articles of clothing and decoration. But they will not study the usefulness of any article carefully. They will take it along on the chance that they can make some use of it. The rule seems to be — take everything that can be seized, for it may be of use some time.

The instinct of acquisition is in part responsible for the stealing activities of gangs. This instinct is, however, revealed in other ways than in stealing. The members of a gang will collect objects which they have not stolen, such as butterflies, plants, birds' eggs, pieces of wood, horseshoes found on the street, and indeed almost any object which can be easily conveyed to their rendezvous. As a rule, these objects are kept in gang headquarters, though this is not always the case. One member of a gang may feel the instinct of acquisition so profoundly that he will keep what he collects for himself even though he is closely attached to the members of the group. One sees here the beginning of the interest in private property, whereby the individual uses what he acquires for his own advantage and resists the encroachments of all others, even his pals, upon his accumulation. This merely acquisitive instinct which leads to the collecting of all kinds of "junk" reaches its height normally between thirteen and fifteen. By the age of seventeen it subsides; and it often disappears completely at about this age. This is not to say that the eighteen-year-old individual will not be interested in acquiring property. But from the eighteenth year on his acquisitions will be confined largely to objects which have real value in the eyes of the people in the community. He will now acquire articles of dress, — ties, socks, shoes, hats, and even suits of clothing. He will collect

The instinct of acquisition

useful objects such as bicycles, tools, electrical apparatus, fountain pens, and so on. In due course he will manifest an interest in acquiring books and works of art, but this interest comes last in the development of the instinct of acquisition.

The tribal character of gang activities is illustrated strikingly in the tendency of members of a gang to destroy property which they cannot steal. They will ransack a vacant house and before they leave it they may break every window. They may even batter down the doors. Then when they make their escape they will be likely to celebrate their achievement by yelling boisterously and defiantly. Sometimes gangs will go so far as to set fire to unoccupied buildings, partly no doubt for the purpose of observing the flames; but they seem also to find pleasure in wantonly destroying a house or barn or shed. When questioned concerning their motives, boys who are guilty of incendiarism seem unable to explain their abnormal interest except to say that they "like to see things burn down." When asked if they do not appreciate that when they set fire to buildings they are destroying what it cost some one a good deal of money and effort to build, they show that such thoughts never enter their minds. The instinct to destroy is so profound that it apparently dislodges, temporarily at any rate, all they have heard or been taught regarding the meaning and value of property and its inviolability. One can account for this strange instinct only by assuming that it is reminiscent of the tribal practice of destroying all the property of rival tribes in order to weaken their enemies. The possession of huts, tents and the like by any people is of advantage in the struggle for supremacy, and it is therefore imperative that a rival tribe should destroy them whenever possible. This trait is manifested occasionally by advanced nations, as when Germany during the World War, in violation of international law, destroyed the

Destruction of property

property of the countries which it had overrun in order to weaken the people with whom it was in conflict.

Gangs not only prey upon the property of people; they also harass the people themselves. A considerable part of the activities of typical gangs have relation to plaguing people. They throw snowballs at them or call them humiliating names if they have any peculiar characteristics of features or body or manner of walking and the like. They ring door-bells, rap on windows, throw eggs or rotten fruit at peddlers or teachers or ministers, conceal bricks in paper bags and put them on the sidewalk so that men will kick at them, put salt in one's milk or thistles in one's bed, and so on to any length. They will go as far as they dare in making life uncomfortable for persons who seem to be conventional or well-behaved. When questioned regarding their motive in these hectoring activities they are usually not able to give a definite answer. Whenever they respond at all they generally say that they want to see what will happen or they like to have the one who is annoyed chase them.

Plaguing people

It is rare that boys who engage in these stealing, destructive and plaguing activities do not use profanity. The boy who is most vigorous and vociferous in swearing and cursing, other things being equal, will win the homage of his associates because he impresses them as being a fellow of great force and courage who can carry his plans through to a successful issue. A swearing boy is more to be feared as a rule than a non-swearing one. The enterprises in which the gang engages can be carried on best apparently by boys whose character requires profanity in order to be adequately expressed. Dare-deviltry and swearing and cursing seem aspects of the same general trait.

Profanity and the use of tobacco go hand in hand with stealing, etc.

Also the use of tobacco and profanity often go hand in hand. Almost never does one see a profane boy of the gang age who

is not a smoker if he can secure cigarettes or tobacco in any form, and it is also rare to find a boy who uses tobacco who is not profane. Tobacco may have a physiological effect on a boy which reduces restraint and liberates the rougher impulses which can be better expressed by profanity than by conventional speech. But it is more probable that the use of tobacco and profanity are both phases of a general trait of character which asserts itself in opposition to the rules, regulations and conventions of organized society. Both swearing and smoking by boys in the early teens are condemned by the home and the school and the church, and the boy who is hostile to these institutions will manifest his hostility by practicing the activities which they condemn. Even if he does not feel antagonism to social institutions when he begins to smoke and to swear, still as he becomes proficient in these arts he will attract to himself boys who will awaken and strengthen his opposition to the conventions and customs of adult society.

Fortunately not all of the interests of the gang run counter to the conventions and institutions of adult society. Truancy is an illustration of a gang activity which is on the border line between the activities that are commended by society and those that are condemned by it. When truancy takes the form of running away from school, then it is a violation of rules and regulations insisted upon by the school and the home. But frequently truancy is manifested simply in roaming the country on Saturdays and Sundays or after hours on regular school days. Often boys do no harm on these hikes; they merely wander about as though they found pleasure in visiting new places, in the hope probably that some interesting event may happen at any moment if they will keep on the move. If they do not encounter bears or Indians or start up rabbits or birds, they may at least find peculiar looking stones or holes dug in the earth or the remains of camping parties in the woods,

Truancy

and so on. Ordinarily, trophies are brought back from these roaming expeditions, and are added to the collections of the gang as a whole or of individual members. This impulse to roam about, particularly in the woods and along the banks of streams, seems to be reminiscent of the nomadic periods in race development. Tramps and gypsies still retain the once universal practice of wandering from place to place in search of food, protection and diversion that can be secured without systematic labor. In remote times savage tribes were constantly on the go, partly because of the need of finding new hunting grounds or fresh waters for fishing, and partly also because of the relentless encroachments of enemies. The impulse to wander away from home environments is seen among animals and birds as well as among races of men. Especially is this true with the young, when the age arrives when they are able to take care of themselves; then they are seized with a sort of madness to escape from the nest or the lair or the den. The wide distribution of animals as well as men over the face of the earth is dependent in a measure upon this deep-seated trait.

Swimming

Swimming is another activity which is on the border line between the permissible and the forbidden activities of the early teens. The impulse to play in the water is very profound, and it will be gratified even in the face of certain punishment by the teacher, the parent or the municipal officers. Boys in the gang age will take many chances in respect to their well-being and safety in indulging the passion to swim. Gangs can be seen setting out toward swimming-holes as soon as the ice breaks up in the spring, and they will be found there until late in the fall. The fascination of the swimming-hole is at the bottom of many of the annoying irregularities of boys in conforming to the regulations of the home and the school.

Some of the activities encouraged by gangs meet with the approval of adults. One gang will compete with another one in

games, running matches of all kinds, — long-distance running, sprinting, hurdling, cross-country running, "Hare and Hounds," "Fox and Geese," "Steeple Chase" and the like. They will also compete in jumping matches, — long jump, high jump, vaulting, hopping on one foot and then on the other, then alternating, then combining hopping and jumping and vaulting. They will compete in games like "Leap-frog," varying the conditions of each game so as to make it as complex as possible. They will also have throwing contests, — throwing stones with the hand and with sling-shots, throwing snow-balls, and the like. In short, gangs often spend their time quite largely in competing among themselves and with other gangs in every kind of contest they can devise which will test physical skill, strength, endurance and courage.

Competition in games

We should turn our attention now for a moment to the activities of girl groups in the early teens. Girls do not develop gangs in the early teens; they do not very early develop organized groups of any kind with leaders and rigid requirements for membership and rules of order. They form groups as a rule for social and charitable purposes. But only those girls are likely to form a group whose parents have the same social status in the community. A gang of boys will admit any boy who promises to make a good gangster; but a group of girls may not take in any girl who promises to be a good group member unless her family has as good social standing as the families of the members who constitute the group.

Girls form "sets" which are only loosely organized

The activities of girls in their clubs are much less varied than are the activities of boys in their gangs. Girls' societies attract less attention than gangs because their activities do not jeopardize the laws and institutions in the community. Adults usually approve of the group activities of young girls, for the girls play with their dolls, visit one another and talk about their ex-

periences in training the dolls, providing them with proper clothing for all social occasions, and the like. Girls much more readily than boys engage in charitable work in the community; they make clothing for needy children; they help at charity fairs; they assist in church functions; in brief, they easily, in comparison with boys, adapt themselves to the serious activities of adults.

FIG. 27. — A typical scene in an American dance hall. The dancers are in the adolescent period. (See exercise 18, page 351.)

Activities growing out of sex interest

It was intimated at the outset of this chapter that during the early teens profound physiological, intellectual and emotional changes occur. The most important development of this period is the rapid maturing of sex function. The activities of boys by the age of seventeen and girls by sixteen are determined quite largely by the impulses growing out of sex interests. The girl abandons doll play and gives her attention largely to personal improvement. Adornment occupies the first place in the girl's attention.

The topics which girls of sixteen talk about concern largely problems of adornment and their relations to the opposite sex. Dancing now makes a stronger appeal to the girl than any other activity. Some girls take an interest in basket ball, hockey, skating, swimming, hiking and the like, but ordinarily they must be encouraged by parents and teachers to keep up their interest in such activities. Left to themselves their thoughts will center mainly around the dance and any activities which will gratify the sex interest in conformity with the conventions and restraints imposed by society.

FIG. 28. — Boys in the early adolescent period. (See exercise 22, page 334.)

Normally a boy's interest in the opposite sex reaches its height at about eighteen. At twelve he cannot be induced to call on a girl for a visit, though he will play with her if she can play a good game. But at eighteen he is not interested primarily in her ability to play any game. He is concerned solely with her personal characteristics, and this gives a bent to all his activities in which sex relation plays a part.

Boys in the later teens do not abandon all their pubertal interests and activities, but these latter are much less prominent at eighteen than they were at fourteen. They like games such as baseball, football, basket ball, boat races and the like, mainly

because in all of these games one team is pitted against another team. At eighteen and afterward games must be built around teams in order to make a strong appeal. There is an interest in team activity at thirteen, but it is not nearly so pronounced as it is a few years later.

By the age of sixteen, sometimes earlier, boys feel a strong impulse to engage in work which will produce funds. They want to get a "job." The basis of this interest is partly in their appreciation of the value of money, but even if they do not make much money they will still respond to the call to get a job if one can be secured. The home-making instinct is probably mainly responsible for the boy's eagerness to earn money. Then, too, the sixteen-year-old boy is beginning to look forward to his future work and he sees, dimly of course at first, that it is worth while to be able to hold down a job. The boy who can do this has some claim to be regarded as a man; and he desires now not to be classed with twelve- or thirteen-year-olds but with those who are farther along toward manhood than he is himself.

Eagerness to find a job

PART TWO

EDUCATIONAL INTERPRETATIONS

CHAPTER XI

DYNAMIC EDUCATION: GENERAL PRINCIPLES

THE preceding discussion should have impressed the principle that dynamic experience is essential to the gaining of clear, definite, effective ideas relating either to the social or the natural environment. To know a thing means first and in large part that one understands what can be done with it or what it can do. Thus, I cannot be said to know a horse until I have tried to manage horses — measured my muscles against theirs, and had vital relations with them. Simply looking at a horse or reading about it cannot give me effective knowledge regarding it. So in order that the individual may come into harmonious relations with the world about him he must deal with it first in a concrete, dynamic way; he must have varied contact and give-and-take relations with it.

The meaning of dynamic education

To comprehend adequately the characteristics of any occupation or activity, one must actually reproduce the movements and adjustments of that activity or occupation. Merely to read about the work of the blacksmith or carpenter or farmer, or even to look at them while they are busy in their several ways, or to listen to them describe their daily round of duties will yield at best only vague and blurred outlines of their functions; but when a pupil cultivates a garden or makes a hand-sled or fashions into desired shape a piece of iron, — these and other like tasks that the young take delight in performing will serve best to give real and accurate knowledge of these activities.

How the child is enabled to interpret the world about him

This truth has long been recognized by students of education. From the time of Locke to the present, educational re-

formers have pointed out the shortcomings of verbal teaching. In the words of Rousseau, — "In any study, words that represent things are nothing without the ideas of the things they represent. We, however, limit children to these signs without ever being able to make them understand the things represented. We think we are teaching the child the description of the earth, when he is merely learning maps. We teach him the names of cities, countries, rivers; he has no idea that they exist anywhere but on the map we use in pointing them out to him."

But we have already entered upon what might be called the era of dynamic educational method. In the modern kindergarten, for example, the pupil devotes much of his time to constructive activities that are planned to meet his everyday needs. A well conducted kindergarten is a place of testing, of experimenting, of constructing, of practicing in play the serious enterprises of later life. The pupil does not spend his time simply memorizing the names of things; he works with the things themselves. He may not be able to read or write the words *clay*, *hammer*, *knife*, *flower*, and so on, but it is planned that he should come to know these things by working with them directly. Again, the cordial welcome which our people have given the Montessori methods indicates that we appreciate a system of teaching and training based on the dynamic nature and needs of the young.

The dynamic principle illustrated in the Montessori schools

In the "Houses of Childhood" the children are always *doing;* they are not required to sit in seats and memorize words. They are engaged in buttoning and lacing frames, performing such acts as they need to perform in buttoning and unbuttoning their own clothes and in lacing and unlacing their shoes. They build towers with blocks of varying sizes. They match colored spools. They use their fingers to trace letters or geometrical figures or to

measure distances. They employ their muscles to estimate the relative weight of different objects. They are blindfolded and then fit geometrical inserts into their proper forms, and in this way they must discover through feeling the characteristics and relations of different forms. They learn to read in part by constructing words from letters cut out of cardboard. They learn to write by tracing words on the sand or the floor or the blackboard.

The Montessori system is based on the principle that the child can learn only through sense activity and motor action. Dr. Montessori did not discover this fundamental principle of learning. Every serious student of childhood and education from Locke to the people of our own day has emphasized it. Dr. Montessori has applied the principle skillfully in devising apparatus which exercises the senses and stimulates constructive activities. She is not a "discoverer" or a "wonder-worker"; she is simply a clever and resourceful teacher who is familiar with what many investigators have done and many teachers have accomplished; and she has made some advance upon what others have achieved in the practical training of young children.

The Montessori apparatus has been regarded by some as possessing mystic value. But it is not necessary to have this apparatus in order to apply the Montessori principles. Any ordinary home or school could afford children much of the sensory and motor experience that can be gained from the Montessori apparatus. This apparatus is designed to give children training in doing some of the important things they will need to do in daily life and to stimulate them to observe and discriminate carefully through all the senses. A child from three to six years of age who is allowed considerable freedom in the use of objects in the home, and who can be with his mother in the kitchen and elsewhere and participate in her activities will

gain the sort of experience that he is expected to derive from the use of the Montessori apparatus. Further, if he has a sandpile and a collie dog, and tools such as a hammer and saw and the like, and a few pieces of gymnastic apparatus, — a rope ladder, and a swing and trapeze, for instance, — he will gain more varied experience than he could acquire if he should be confined to the Montessori apparatus alone.

FIG. 29. — Teachers in progressive schools frequently take their pupils to see objects and industries which they read about in school. (See exercise 17, page 362.)

The dynamic principle applied to all school work

The dynamic principle is being applied in the elementary, grammar and high schools, as well as in the kindergarten and the Montessori schools, though, as we shall see later, the higher the pupil ascends in school, the more his work must consist in organizing and interpreting his experiences. But the fundamental aim of progressive schools of every grade to-day is to have pupils master *things* and *actions* as well as *words* and *rules*. We are

hearing much about the Gary schools, the Fairhope school, and others of similar character; but they are merely conspicuous illustrations of tendencies to be seen everywhere throughout the country. Most of the developments taking place in the schools concern the working out of this dynamic aim. Much of the discussion at educational meetings and a large part of the articles in educational magazines deal with ways and means, first, of bringing pupils into immediate contact with the objects which they are studying, and second, of learning by doing rather than by reciting alone. He is regarded as the most skillful teacher who is most resourceful in leading his pupils actually to experiment with the objects or to perform the actions which he is teaching them. On the other hand, he who is regarded as the most ineffective teacher, the one who is farthest behind the times, is he who simply has his pupils sit in their seats and memorize rules and apply them to imaginary rather than real, every-day problems. There are certain sections of the country in which teaching is still largely of the latter sort, and these sections are regarded by educational people everywhere as retarded in their educational development.

The principles mentioned in the foregoing paragraphs respecting the rôle of dynamic activity in learning should determine in large degree the teaching of all studies, particularly in elementary education. To begin with, teachers are becoming convinced that a pupil can acquire a mastery of arithmetic only by using it in a concrete manner in the construction of his playhouses or other objects, in actual or make-believe buying and selling, in weighing and measuring the commodities he is familiar with, and in other ways necessitated by the experiences of daily life. So many of the child's interests require the ready and accurate use of arithmetic that there should be no difficulty in presenting it to him in a dynamic manner. It should be borne in mind

The dynamic principle applied in arithmetic

that what a pupil is unable to *use* at any time cannot be taught him most economically and efficiently at that time.

The Committee of Ten, the first of the long list of committees which have during the past two decades discussed education from the standpoint of developing efficiency rather than disciplining the mental faculties, has protested against much that is taught under the term "commercial arithmetic." In speaking of

FIG. 30. — In this school pupils learn tables of measurement by actually using the various measures. (See exercise 39, page 367.)

such subjects as banking, insurance, discount, partial payments, equation of payments, and the like, the Committee says that in the textbooks "we find the subjects in question prefaced by very excellent definitions. The pupil who masters them will be able to state on examination that the market value of stock is what the stock brings per share when sold for cash; that stock is at a discount when its market value is less than its par value; that its par value is that named in the certifi-

cate; that the payee of a bill of exchange is the person to whom the money is ordered to be paid; in fine, to state in brief sentences the first principles of commercial law. He may also, after much conjecturing, be able to solve many questions in banking, exchange, insurance, and custom-house business. But until he is brought into actual contact with the business itself, he can form no clear conception of what it all means, or what are the uses or applications of the problems he is solving. On the other hand, when he is once brought face to face with business as an actuality; when for the first time he becomes a depositor in a savings bank, or a purchaser of shares in a corporation, he will find all the arithmetic necessary for his purposes to be interest, discount, and percentage. The conceptions which he vainly endeavored to master by recitations from a textbook take their places in his mind with hardly the necessity of an effort on his part."

It is encouraging to note the change which is taking place in the textbooks in arithmetic. Those now coming from the press are requiring the pupil to react upon his environment in ways which will require him to use the arithmetic he is trying to learn. The mere memorizing of definitions or fundamental operations and applying them in the solution of problems entirely remote from the pupil's daily life is passing, though it has not disappeared altogether by any means. The boys who take part in the annual corn-raising contests in the country schools of Winnebago County, Illinois, for instance, thoroughly master a large part of the essentials of arithmetic, for they must make careful measurements of the land on which the corn is raised, careful computation of the amount of seed needed, of the yield from each hill, of the value of the crop, and the percentage of profit.

The principle in question is universal in its application to the work of the schoolroom. One cannot make a mistake in

saying that a pupil will gain effective command of reading and spelling only by *using* these arts in some vital way. They must not be set apart from his active life, but must be made the means of acquiring useful knowledge, recording it, and communicating with his friends. As early as the tenth year children will strive with all their might to write well when they wish to send a letter to some friend. Then they will give attention to chirography and

Even formal studies can be taught dynamically

FIG. 31. — Farmer boys engaged in judging different varieties of corn. (See exercise 41, page 367.)

spelling. They will work out the meaning of words, securing help from every available source when they wish to decipher the story in some interesting book. In the same way the college student will attack with zest and enthusiasm the difficulties of a foreign language when he is looking forward to a trip abroad. The chief function of both teacher and textbook should be to create situations appealing so strongly to the learner's interests and impulses that he will largely disregard the drudgery

of mastering the technique of a subject, as he fixes his attention upon the end to be reached and eagerly presses toward it.

The subject which has offered the greatest resistance of any in the elementary school curriculum to the application of dynamic methods is grammar. It has been more than any other study the despair of teachers and the bugbear of pupils. Yet it is possible to combine the use of language and the technique of grammar and to relate both to the pupil's actual experience in such a way that he will come to appreciate the help that he will receive from the study of grammar. The sentence, as the pupil himself uses it, especially in written expression, should be made the basis of grammatical study. His own compositions upon subjects in which he is vitally interested will furnish all the materials necessary for gaining a mastery of the essentials of grammar. From his own essays he may be led to see what the nature of a sentence is; what various functions words perform; the changes that occur in words as they are used in varied relations; the necessity for different kinds of sentences, and the characteristics of each. In short, he may be so taught that he will come to regard grammar as a useful tool, which, like the ability to read and to write, he sees to be absolutely necessary for the adequate interchange of thought.

Dynamic methods in secondary education

It is not only in the elementary and grammar school that the need for vital, dynamic teaching exists. It is generally agreed that formal, verbal methods have endured more tenaciously in the high school than in the lower schools. It is not uncommon to hear the statement made among high-school teachers that if a teacher knows his subject, the problem of presenting it to pupils will take care of itself. This view has been responsible to a large extent for the static teaching that persists in high schools in communities in which the methods in the elementary school are being made vital and dynamic. The Committee of Ten

already referred to recognized the static, formal character of high-school teaching throughout the country when the Report was written; and while the situation is improving slowly there is much, very much, still to be accomplished before high-school work in many schools will be effective.

The chief emphasis in the teaching of a foreign language, for example, has been put upon the memorizing of rules and forms and syntactical constructions as ends in themselves rather than as auxiliaries to the "penetration of the sense." The Committee of Ten pointed out the futility of such teaching, saying that "at the very outset the student should be made to understand that these things are not ends but tools, and that the end is to gain, through the reading of Latin, an insight into the thought and feeling of a people who have contributed very largely to making the life of the civilized world of to-day what it is. The 'Commentaries of Caesar,' the 'Epics of Virgil,' and the 'Orations of Cicero'—commonly spoken of as subjects required for admission to college — are in reality masterpieces of literary style and historical documents of first-rate importance."

The Committee of Twelve, as well as the Committee of Ten, has emphasized the need of making a foreign language *significant* to the pupil; of so handling it that he will feel its usefulness in his daily life. It must not be regarded as a thing apart from his vital interests. The Committee of Twelve says: "The study of French and German in the secondary schools is profitable in three ways: First, as an introduction to the life and literature of France and Germany; secondly, as a preparation for intellectual pursuits that require the ability to read French and German for information; thirdly, as the foundation of an accomplishment that may become useful in business and travel."

The dynamic principle applies as well to the teaching of English in the high school as of language in the elementary school.

But rules of rhetoric and definitions of qualities of style have been laboriously memorized by high-school pupils, though it is now generally acknowledged that this static knowledge has been fruitless in developing in the learner a command of clear, facile and effective written or oral expression. Instead of memorizing set rules for recitation and then applying them in a mechanical way, the pupil must be placed in situations which will awaken the desire to express himself forcefully and pleasantly. He must be led to see the error or inadequacy or inefficiency of his expression, and by constant scrutiny and revision of his own work he will be helped to acquire the art of clear and effective expression. The pupil should never be required to learn rules and forms as ends in themselves, or in the belief that at some distant time he may chance to need them. He must gain them when and as he needs them to accomplish real tasks which have meaning and value for him.

Making rhetoric dynamic

Turning now to dynamic teaching of science studies, some readers can doubtless remember when physics, chemistry, botany, zoölogy, physiology, geology, and astronomy were taught almost wholly from a textbook, and in the space of thirteen weeks each. A few years ago it was deemed a waste of time and energy for a pupil to use a microscope in botanical or zoölogical study, or physical apparatus in the study of physics. Sometimes the instructor would illustrate what he was teaching with an experiment or a specimen, but usually he had neither the skill nor the equipment to perform experiments successfully or to secure specimens in botany or zoölogy or geology which would be interesting or instructive to pupils.

The teaching of science in the high school

It is now generally admitted that there is no group of subjects which contribute more to the pupil's understanding of and adjustment to the world in which he lives than the sciences,

provided they are taught from the standpoint of the pupil's interests and needs rather than from the point of view of formal definition and classification. In progressive high schools today, laboratories are provided for the study of all the sciences; and pupils are given opportunity and are required to test, weigh, measure, collect and represent, — in short, to come into vital, dynamic relations with the objects and phenomena which the sciences describe. The past ten years have witnessed great improvements in science textbooks, and many voices are now raised against confining the study of nature to the printed page. Instead it is being urged that the pupil should go where nature is manifested and learn what she is in her varied forms by direct observation and by trying what he can do with her. It is this experience and this only that will yield vital knowledge and that will enlist genuine interest.

Dynamic teaching of citizenship

There is one subject which is destined to occupy a very prominent place in the high-school curriculum, — the study of citizenship with a view to making pupils intelligent regarding the genius of our government and patriotic in devotion to the welfare of its institutions; and it may be appropriate to give special attention here to this subject. Frequently a pupil memorizes definitions relating to what might be called the anatomy or structure of government, and he becomes submerged in technical matters which he cannot understand because he has had no concrete contact with them, and so of course he can take no interest in the functions of our government or the ideals underlying our institutions.

The proper time to instruct a pupil regarding citizenship and patriotism is when he begins to assume the duties of a citizen in some simple way, as in observing and helping to endorse regulations pertaining to clean roads or streets and all like matters in his community. Comprehension of the government of our

country and respect and love for its institutions can never be developed in the young in an effective way by a mere technical study of the machinery of government. Mechanical conning of definitions in civics and political economy will never fill the minds of youth with understanding and their hearts with genuine enthusiasm for their native land. Nor will a formal salute

FIG. 32. — Fourteen children from fourteen different countries all in one and the same public school. (See exercise 42, page 367.)

to the flag, daily repeated in terms largely meaningless to children, be effective in developing real patriotic feeling.

The principle is that education for citizenship and the development of patriotism must be at every point dynamic. The child must at the appropriate time be made to participate in a concrete, vital manner in the functions of government in his every-day life; he must be led to see how pervasive is the in-

tangible thing we call government, which hedges and guards him at every turn. In this way he should be led to appreciate the reasons why he must do the things which the regulations of his community constantly enforce upon him and his fellows. He must be made to appreciate, not in definitions and verbal statements but in persons and actions, the source of authority for these regulations, and by what right certain individuals are clothed with power to compel their observance. This direct face-to-face and hand-to-hand contact with law, both in its making and in its operation, is the only means by which our youth are likely to gain a genuine comprehension of and respect and love for our institutions, and a desire to make them stable and permanent by patriotic and law-abiding conduct.

Developing patriotism

As a test of the principles involved in our discussion, will you who are reading these lines ask yourself the question, — Do I really love my country, or am I merely able to recite a few patriotic verses concerning it? If you think you have genuine feeling for your country, see if you can discover if you have ever given any concrete evidence of your regard for your country. Have you sacrificed any pleasure or profit for it? Have you defended it against real or imaginary danger? Have you ever stood up for it when it was threatened by its enemies, without or within? What deeds have you performed which have shown that you have true affection for your native land?

Next, study the boys and girls you know from the age of eight or nine to twenty, with a view to ascertaining whether they are aware that they have a country to which they should be loyal, and for which they should have warm, generous feelings. Take a typical boy of any age, and note what he says or does which will give a clew to his attitude toward his country. Does he defend it when his companions say harsh things about it? Does he indicate by word or by deed that he would forfeit any

goods or pleasures in order that his country might be the stronger or safer or more prosperous thereby?

If you will in this way make a critical, unprejudiced diagnosis of your own attitude toward your country and also the attitude of the young people with whom you come in contact, you will probably be surprised at the small degree of awareness of native land which you can discover. Many American youths do not feel generous affection for their country. They are not convinced that it has real existence and needs to be served. Most persons, young and old, go about their daily work and play and do not think of their country once a month. They participate in the election of a president and congressman and other officers, but they regard them as individuals who are paid for performing their tasks just as we are all paid for the work we do, and they praise or criticize their actions just as they do in the case of other men.

We have all studied civics. We have learned what the different governmental units and the offices are, and perhaps the names of the office-holders. But most of us have not gone further than this. We do not realize that there is a vital, reciprocal, dependable relationship between ourselves and our country. "Our country" is merely a phrase, not a reality, to many of us.

In the schools pupils say that they live in a "land of liberty"; but how many of them appreciate what this means? What proportion of them realize the advantages of living in a land of freedom, as contrasted with a land of bondage? If there be any reader who has not reflected on this matter, let him ask an eighth-grade or even a high-school pupil what privileges he has in America which he could not have in Germany or Russia or Japan or Sweden or Spain. Ask a graduate of a high school whether he has educational advantages here which he could not have in other countries, and see how much he knows about

the matter. The writer has tried this time and again, and the majority of high-school graduates can make no intelligent response to any questions of this kind. Even the majority of college graduates have but slight appreciation of the advantages which they enjoy in this country but which most of the people in other countries do not enjoy.

The first thing to do in teaching love of country is to make our young people vividly conscious of the fact that in America all the people are guaranteed the right to try to accomplish the aims toward which they are striving. Let anyone go to any part of our country and he can live his life as he chooses, so long as he does not trespass upon the freedom and rights of his fellows. Let him go to the farthermost ends of the earth and his country will protect him and safeguard him. His country guarantees him manifold benefits, — spiritual, intellectual, physical. Let these benefits be mentioned concretely in every schoolroom so that pupils will gain a sense of the reality of the existence and thoughtfulness of their country.

The first step in developing love of country

When one is vividly conscious of the devotion and helpfulness of his country, then there will be a chance of awakening his love for it. But we cannot have warm feeling for a mere abstraction. We cannot love an impersonal, verbal thing. Our affections go out only to objects that have life and feeling like ourselves, and that also have needs like our own, and that in times of stress and strain require our service.

Happily we are attaining greater success now than formerly in making children aware of the debt they owe their country. In some schools teachers are leading pupils to see how one person is dependent upon others; how we are all members of one body, and how wretched we would be if we were not helped by our fellows. This idea of dependence and coöperation is kept uppermost now in the

We are all members of one body

study of citizenship in all progressive schools. The idea is developed first in the home. The young pupil is led to see how his welfare depends upon the service rendered by father, mother, brothers, and sisters. Then the question is put to him, "What ought you to do for them?" These ideas are worked out through many concrete instances, and in the end the child is led to realize that there is mutual dependence, and that every member is indebted to every other one. Thus he acquires a loyalty to the family and becomes patriotic with respect to it.

Then his inquiry extends to the school. He is guided to see how in a school, too, all are members of one body. If any member is not loyal, if he will not serve the school, if he will not play fair, then he ought not to be in the school at all. When this idea is presented very concretely, every pupil can be made to feel that the school serves him and he in turn should serve it. The writer has observed pupils who were more or less indifferent about the school as such, who did not feel any responsibility toward it, but who developed a loyalty to it when they had been led to see how the school helps them, and how it would be impossible to have a school if each member did not coöperate and was not faithful, loyal, and patriotic.

Then the pupil is led to study community life, with the emphasis upon *life*. He is made to see that the community is a great living organism, and there is government in order that people may get the most out of life. And just as in the home and in the school all are members of one body, so it is in the community. And further, as the community protects and helps the individual, as it wards off disaster, secures pure milk and pure water, guards against contagious disease, gets people out of burning buildings, and so on, so each individual must play fair with the community. He must do nothing which will disrupt the community or prevent it from serving all the people in the best way. Not only this,

The study of community life

but he must give his services when needed to advance the interests of the community. It helps him and he must help it. If it is threatened in any way he must go to the rescue, and do what he can to save it.

And then his inquiry widens out, and he sees what the state means, and how he could not have the advantages he enjoys if there were no state; and in many concrete ways he comes to see that the sole purpose of the state is to help the people to coöperate so that they can make the most of life.

And finally the inquiry extends to the nation. And in the same concrete way as the pupil learns that the home, the school, the community, and the state help him, and that he must be loyal and in times of need he must sacrifice for them, so with the nation. "My country" then becomes a living reality to him.

Saluting the flag, paying tribute to it, singing songs in its honor will help the child to think and feel about his country in a concrete way. It will not accomplish much, however, unless the flag is made to stand for *service*. A teacher might very well every day in her school refer to the flag simply as a symbol of some concrete act which the country performs for the pupils of the school. When she shows how the country aids people to achieve what they wish and protects them from disease and harm of all sorts, she can point to the flag and say: "This flag is the sign that our country is thinking of us and working for us. It is a sign that we should be devoted to our country, or it cannot continue to do for us what it wishes to do or what it has done. Let us salute the flag to show that we understand what our country is trying to do for us all and that we will be loyal to it. We will do nothing to interfere with our country's welfare, and when it needs our service we will respond. We will give our hands, our heads, and our hearts to our country when it is in need."

CHAPTER XII

DYNAMIC EDUCATION: THE RÔLE OF SUGGESTION

Observe a person learning to ride a bicycle in a riding gallery. The novice will usually keep his eye on the posts which he should avoid and he will say, — "I must not run into them," with the result that he will ordinarily go straight for them. An experienced bicyclist riding in a crowded street does not keep his eye on the street car or the truck to be avoided, so much as he keeps it on the point he must reach in order to escape harm. The point is that one will usually go where his attention goes.

Action follows the direction of attention

By way of illustrating a special phase of the matter, a teacher said to a class of pupils, — "Don't look at what some busybody has written on the blackboard here at the right." Instantly most of the eyes in the class were turned toward the board. Many of the pupils felt humiliated when they realized that they had disobeyed the command given; but viewed from a psychological standpoint the command was: "Look at the board." It would be safe to say that in any group of children or adults three fourths of them would do a thing like this which they were commanded not to do. They might regret it afterward, but they would respond positively to the negative suggestion.

Many tragedies occur every day in the schoolrooms of the country through purely negative commands. A teacher says to a pupil who is inclined to communicate: "You must not turn around and whisper to the one behind you, or I will punish you." She gives him nothing absorbing to do which will divert his attention from the temptation to whisper. He is simply left in a

vacant state of mind, the teacher believing that the command she has given him will hold him in check.

It is especially important that we should adopt a constructive method of dealing with children's aches, ills and defects of every sort. One way to fix the habit of stuttering, for instance, is to talk to the victim about it, and say to him: "You must not do that. You ought to be ashamed of yourself," and so on. If one cannot give the sufferer confidence in his ability to speak without hesitation; if one cannot interest him in something which will lead his thought away from himself; if one cannot put courage in the place of fear, one can never cure his stuttering.

The constructive treatment of aches and ills

A competent physician will not allow gloomy persons to talk to his patients. He will particularly forbid anyone to say to a sick person: "Your case is a desperate one. You will have a hard fight. You may get through, but I have known many people with your trouble who went under. I hope you will pull out of it, but I wish you were looking better."

Students of psychology sometimes try the experiment of suggesting to a fellow student that he is coming down with a disease which is epidemic in the vicinity. One student will meet the victim and say to him: "What's the matter with you? You look as though you had that disease that is going around the neighborhood. You ought to watch out. People are coming down with it every day. If I were in your place, I would get home without delay." In a few minutes another student will meet him and make about the same comment as the first one did. So a third, a fourth, and a fifth experimenter will impress upon him that he has all the signs of the prevailing disease. If the victim is not aware of the hoax, he will in nine cases out of ten be in a disturbed condition, physically and mentally, by the time the fifth conspirator reaches him. This is not a trick which should be generally played on one's friends. Some persons are

more suggestible than others, and they would be seriously affected if several persons should give them a terrifying account of the condition of their health.

Children are especially suggestible in respect to pains and fears. One can lead a young child to see any fearsome object that is suggested in the dark. Try this experiment if you think it is safe: Blindfold a child. Tell him you will let some water drop on his hands to see how hot he can endure it. Have some hot water near by. Also have some cold water concealed. Let a drop of the cold water fall on his hand and the chances are he will declare that the water is hot. Many adults even would be unable to resist the suggestion. There are cases on record of serious results of initiations in college and secret societies in which it was suggested to the initiate that some ordeal would be inflicted upon him, whereas the thing was not done at all.

We are accustomed to say that childhood is the time of fancy. We mean by this that the child's images are often more vivid than his perceptions. He sees and hears what is aroused within rather than what is presented from without. This will explain why children so often misrepresent objects and events. The adult can appreciate the principle involved if he will consider his own case when he has a bad dream and awakens believing that the things of his fancy are real. It may take him some time to discover that what he thought he saw and heard was imaginary.

So we may count upon it that most persons — and practically all children — will be much influenced by what is suggested to them. If a child has cut himself, for instance, so that the blood flows, and if adults in their expressions seem to indicate that the thing is very serious, and they lament over him, they will intensify his suffering. On the other hand, it will seem much less serious to the child if the adults say: "Oh, that is nothing; I will help

One can intensify children's misfortunes by suggestion

you tie it up, and it will be all right in a jiffy." It is rare that an individual, old or young, can resist the suggestion of pain. On the other hand, most persons will respond to the suggestion that a pain or any bodily ill is slight or at least temporary, and that if they will try to forget about it, it will soon pass off.

When the world was young, and children were exposed to danger, much more than they are now, they were more likely to be hurt seriously, and so nature equipped them with an instinct to seek help whenever anything amiss happened to them. This instinct is still very active, though the conditions have changed and it is not often now that a child is injured seriously enough to have much attention given to the matter. Adults should be governed by this fact in their treatment of the child's complaints about his painful experiences. He should be taught as early as possible to bear his little mishaps without whimpering. Not once in ten cases probably will they be of sufficient moment to warrant his making complaint about them; he will get over them sooner if he does not do so. Adults cannot do anything for nine tenths of the minor disturbances of childhood and youth. They come and go, and there is no benefit to be gained from talking about them.

This is not to say that a parent or teacher should be callous to the child's petitions for sympathy and help. True sympathy, however, is not sentimental, and more especially it is seldom foolish in making an excessive display over the trifling hurts which children receive. True sympathy will lead a parent to assist a child to forget his minor ills and to acquire the habit of passing them by without noticing them. It is particularly important that adults should not constantly ask children whether they have aches in their stomach or back or head, whether they "feel well," and so on. One way to develop an ache is to ask a person whether he feels it, and particularly to tell him that he looks as though he had it.

It would be well for all concerned if people, young and old, did not give publicity to most of their physical ills. One sometimes is thrown in with an adult who will recite long tales about the misbehavior of his internal organs. He will tell what a hard time he had disposing of the cucumber he ate last night, and of the "stitch in his side," and the "lumbago in his back," and so on *ad nauseam*. It is possible to develop this type of adult by encouraging him when he is a child to tell everyone about his ills.

It will be granted that when a child is suffering serious disturbance it should be discovered early. But the best way to detect this is for the parent and teacher to learn the signs of it so that they can read them without asking the child whether he feels ill. A parent or teacher should be able to tell when a child has a fever, or when he is not being properly nourished, or when he has a long-continued pain due to malfunction of any kind. The less said to the child about these matters the better, unless his case is unusual. The child's health should be in the keeping of parent, teacher and medical inspector. He should follow, as a matter of habit, a healthful régime in respect to food, exercise, cleanliness, etc., and then his thoughts should be kept on optimistic and constructive instead of gloomy and introspective matters.

The use of suggestion in the sick-room

Physicians and nurses are often inclined to augment the troubles of their patients by carelessness in suggesting pain and disaster. The following illustrations are typical: A young woman was recently sent alone to a distant city for an operation on the throat. When she entered the hospital the superintendent asked her a number of questions, — among others this one: "To what address should information be sent in case of your death?" A bystander, observing the girl when this question was asked, would have noticed that the blood left her cheeks and her voice trem-

bled. When she was shown to her room, she was taken down a long hall, on either side of which were rooms occupied by persons who had been operated upon, some of whom presented a gruesome appearance. Shortly after the girl reached her room she was waited upon by a nurse who ascertained her temperature and her pulse, and who left without communicating any of the results to the victim. Then there came another nurse who gave the girl medicine which she said a physician had ordered her to take. She was told that she could not partake of any food before the operation. When she retired she was apprehensive of approaching doom. As might be anticipated, she spent a wakeful night.

Early the next morning nurses appeared to give medicines, to read her temperature and pulse, and finally to robe her in an operating-room garment. She was then wheeled through the halls to the operating room. She was not given a general anæsthetic, so that she was able to observe what was going on around her. In addition to the surgeon there were several understudies and two or three nurses, who were making bandages and boiling all sorts of instruments. When the girl was placed on the operating table she was overcome with terror and fainted, so that it was impossible to perform the operation that day. She was taken to her room and told to be quiet; but every little while during the day a nurse would appear to read her temperature and pulse, or give her medicine; and, to make a long story short, the girl was kept in such a state of fear and tension that she had to leave the hospital without the operation, — the surgeon refusing to operate until her nervous system became steadier.

From the moment the girl entered the hospital until she left it she was subjected to suggestion of pain and disaster. Any suggestible person treated in a similar way would be alarmed. If the officials and nurses had been observers of human nature

they would not have suggested in any way that the girl was facing a terrific ordeal, that she might not survive it, and that her operation would require the attendance of six or eight persons. Hardly anyone could resist the disastrous effect of suggestion of this kind.

The principle applies to every sickroom, no matter where it may be. The first requirement is an expression of good cheer and hopefulness in the presence of an afflicted person. There should be no suggestion of danger or painfulness, even if there is serious trouble ahead. It is shown alike by experience and by experiment, as indicated heretofore, that suggestion of pain is likely to depress vital processes and so to weaken one's resistance to pain when it comes. Preparations for operations that suggest cutting or bleeding should not be made in the presence of the patient. This is especially important when the patient is a child. Frequently the anticipation of pain is more serious than the pain itself, and for this reason the mother or the dentist or the surgeon should make use of every device to lead the patient to think that his trouble will soon be over and there is nothing to be frightened about.

There is another aspect of this matter which is of great importance. A concrete instance will serve as an illustration:

One's defects may be increased by suggestion

Mr. M. recently suffered a slight nervous shock which interfered with his memory, and especially with his speech. It caused him much distress. Since then he has been anxious about his health, and he is afraid of a recurrence of his difficulty. His wife is worried about him and is constantly with him in the hope that she may protect him from experiences which might overtax him. She is, in fact, devoting her life to him now, and she thinks she may be able to bring him back to vigorous health.

Friends of the family call frequently to pay their respects. Mrs. M. always describes Mr. M's. unhappy experience in his

presence. She goes into detail about his loss of memory and his wandering about, not knowing where he was going. She dwells particularly upon his inability to recall words to express his ideas. She tells how he could not frame a sentence and how all his mental processes seemed to go awry. Mr. M. sits through the oft-told story. His wife is such an expert in the use of language that he remains silent while she is speaking. Occasionally he may venture to make a slight correction in her lurid description of his performances while suffering from his affliction, but she insists she is right because she observed him, and he did not know what he was doing.

Mrs. M. has the best of intentions in telling her neighbors about her husband's misfortune. She knows people are curious about his collapse, and she wants to gratify their curiosity. At the same time she wishes people to understand that her husband had a hard time, and she expects that her recital of his troubles will win him the sympathy of his friends.

Unfortunately the more she talks about him the worse it is for him. No one could sit by and listen to the story of his own nervous and mental disturbances without being injured; these irregularities are always intensified by dwelling upon them. One who had temporarily lost the power of constructing a sentence, but who had regained the ability, might lose it again if he should be kept thinking about his trouble. Even one who had never been afflicted in this way might be overtaken with the tragedy if he feared it and thought much about it.

So Mrs. M. is unwittingly interfering with her husband's recovery by talking about his difficulty in his presence. She also injures the people who listen to her. Take a hundred persons chosen at random and describe vividly the mental and nervous disturbance of an individual, and some of them will become morbidly introspective about their own condition. They will imagine they have symptoms somewhat like those described.

And once they begin to be apprehensive about their nervous stability they will probably produce at least minor irregularities even if none existed at the outset. This is likely to be true not only of mental but of all vital processes. Take the first hundred persons one meets and describe to them vividly cases of heart disease, and the chances are that some of them will begin to observe malfunctioning of their own heart, and they will imagine they have the beginning, at least, of the diseases described to them. Quacks and venders of patent medicine understand this principle, and they ask their victims to study a long list of terrifying symptoms which are set forth in an impressive way. Patent medicine is sold very largely by portraying diseases so concretely that morbidly-inclined people of sound health will think they have the diseases.

Not infrequently contagious diseases are made more serious by talking about them before patients. By way of illustration: A twelve-year-old child contracted scarlet fever in school. She was isolated in the home, and the mother served as her nurse. There was a telephone adjoining the sickroom, and the mother telephoned her friends frequently. In describing the child's illness she would tell what a high fever she had, how she was agitated in her sleep, and how she "went out of her head." Nine out of ten children listening to such talk would be depressed by it. The vital processes would be affected unfavorably. Consequently the patient would have a harder time to win out against the disease. Any influence which would lessen the vigor of vital organs in their struggle against the poisons of the disease would give the disease an advantage. A wise parent or physician or friend would say things within the child's hearing which would not magnify the seriousness of the disease, but which would give encouragement and promise of speedy recovery. Talk of this sort would do something toward exhilarating the vital processes so that they could resist the invading disease more effectually.

Suggestion can be employed to elevate or to degrade the morals of a community as well as to strengthen or weaken health or individual character. Here is an illustration: A small-sized city in a mid-western state decided to have a week's "fun" during the month of August last, so a street carnival was held. One of the streets in the center of the city was set aside for shows and revelry. A committee of citizens was appointed to hunt up "attractions." They got together an aggregation of fakirs, human beings with supernumerary limbs and various deformities, animals with extra heads and tails, "educated" animals which were represented to have human intelligence, magicians, fortune tellers, cannibals from the Pacific Islands, and last, but not the least conspicuous, dancing girls from Cairo and from the training lairs in Chicago.

The morals of a community may be elevated or degraded by suggestion

People of all ages, conditions, colors and occupations were admitted to the carnival. All sorts of liberties were permitted; there was, in fact, little restraint on license. When citizens of the town were asked why this carnival was permitted, they replied that it "helped the town." It brought in people from the surrounding country and the small towns, and they spent their money liberally. One man said that "people loosen up when they attend a street carnival. They bring in plenty of money, and they leave it here."

To heighten the attraction of carnival week, a barbecue was held every day in the public park. An ox and other animals were roasted, and for a small sum anyone could have a piece of them. Near by were plenty of saloons, so that no one need go thirsty. It was evident that the people imbibed freely, because many intoxicated persons were seen on the streets every night. At about noon each day there was a "calathumpian parade." Citizens of the place impersonated domestic and wild beasts. They went through the principal streets disporting themselves as

animals would do. The more beast-like the performance of anyone in the parade the better performer he was voted to be.

Contrast the street carnival in this city with another in a city of about the same size situated in one of the irrigated fruit valleys in the Far West. Not many years ago it was a barren desert. But water was brought from the mountains, fruit trees were planted, and to-day it is one of the great fruit valleys of the world. Last summer a three-day blossom festival was held. The people vied with one another in devising original designs with blossoms of all the varieties of fruit grown in the valley. There were various elaborate performances in which blossoms played the leading rôle. The festival attracted people from the towns around, and they were delighted with the celebration.

Which sort of street carnival will have the best influence upon the behavior of people in a city, and particularly upon the conduct of the young? The answer is at hand. Barbecues, "calathumpian parades," displays of deformed human beings, whether real or deceptive, strange, ugly creatures, and lewd singing and dancing all lower the moral tone of any community. Drunkenness and vicious behavior of every sort are suggested and encouraged by such orgies. No community having any regard for the moral welfare of its people, especially its youth, would tolerate such suggestions of barbarism.

The blossom festival, on the other hand, is refining, elevating and refreshing. The people who participate in and witness festivals of this sort will not be incited to sensuous indulgence. They will not relapse into vicious conduct as they will usually do in the sort of carnival first described.

One must fight incessantly against the spread of vice in modern life through agencies like street shows. Such a carnival may in a single week unloose passions which cannot be controlled again for many a month. It may suggest evil conduct which

the home, the church and the school are doing all they can to keep out of the lives of the young.

In this connection mention should be made of the influence of the gayety or burlesque theater in spreading vice. The chief characteristic of the shows presented in them is lewdness in speech, in song and especially in the dance. Women who are reading these lines would probably not be admitted to the burlesque theaters in their respective communities, but they can gain some notion of what goes on within by observing the pictures on the billboards in front of these places. A burlesque performance is built around the suggestion of sexual vice. The actors are for the most part gathered out of the red light and tenderloin districts, and they aim to suggest in dress, song and dance what they practice in the brothel.

Suggestion in the theater

Observe the audiences in these theaters. They are made up entirely of fairly young men. Most of them are smoking; some of them bring drink in with them, and others can easily get it outside the door. They have all been attracted by the prospect of seeing vice luridly displayed. The managers know they can secure audiences when they depict vicious scenes on the billboards. But they would not dare to go as far on the billboards as they go on the stage. Hardly any community is so indecent as to tolerate on the street what is allowed to go on freely in the theater.

What is the effect upon a community of the suggestion of lewdness? There is no mystery about the matter. The path from the burlesque or gayety theater to the tenderloin district is short and direct. It is about as certain as the law of gravitation that lewd suggestion will lead to lewd indulgence. Communities recognize this in a way when they prevent vicious suggestion on the street; but they let it flaunt itself openly on the stage.

Every day the newspapers tell tales of the misdeeds of young

men. Their vicious conduct was probably incited in the burlesque theater. When animal impulse is aroused by suggestive songs and dances the chances are that it will find concrete expression in a large proportion of cases. In spite of this, communities permit the vicious theaters to continue to sow corruption among men when it is certain that the harvest will be licentiousness.

Vice is largely a matter of suggestion; if the latter cannot be eliminated, then the former cannot be held in check. One can hardly think of a more fruitless enterprise than to give formal lectures on morality to persons who are subjected constantly to vicious suggestion in theaters whose sole object is to incite passion.

CHAPTER XIII

OVERSTRAIN IN EDUCATION: WASTEFUL PRACTICES

From one point of view we would not expect either children or adults to be overtaxed in these times. We do not work as hard now as our forefathers did fifty years ago. In former days the young and the old alike arose with the sun and were often busy at hard labor until the sun went down at night. This program was carried out day after day, week after week and month after month. Nowadays there are fewer hours of labor, and work is not so heavy as it was formerly, for we have learned how to make machines perform the heaviest part of our tasks.

Present-day conditions that cause overstrain

And yet we learn from many sources that there is overstrain among the young as well as among adults. The reports made by medical examiners in the public schools of all the larger cities show that a considerable proportion of pupils show "nerve signs." That is to say, they are in a tense or weakened nervous condition. This is undoubtedly due to the fact that the majority of young persons, as well as adults, do more work to-day that overtaxes brain and nerves than they did thirty years ago. The writer can remember the time when most country boys from fourteen years onward would follow a plow all day long; and while they would be weary at night, they would not be nervously fatigued. There is a difference between being muscularly tired and being nervously tense and strained. Modern urban life tends to put children's nerves on edge. Even if a child does not have to do any hard work, mental or physical, he can still hardly escape from being intensely stimulated much of the time. He must adapt

himself to-day to many more people than would have been required of him twenty-five years ago, and this is likely to develop nervous tension. Following a plow all day long is easy on the nerves compared with meeting different people throughout the day and adjusting oneself to them. In addition, a large proportion of young persons must be on crowded streets a considerable part of each day, dodging vehicles, getting out of the way of pedestrians, being angered because of the apparent meanness or selfishness of adults, or being intensely stimulated in rivalry with competitors or in anticipation of approaching exciting events.

One who is using his muscles mainly is working along lines of least resistance as compared with one who is using his brain constantly, whether in study, in social adaptation, or in dealing with complicated and constantly shifting situations such as city life presents. In following a plow the work soon becomes largely automatic, and the mind moves along unobstructedly in a sort of day dream. The plowman is not constantly wrestling with difficult problems. His energies are being expended mostly through his muscles, thus relieving his nervous system. When he has finished his day's work he can lie down and he may be asleep as soon as his head touches the pillow.

But it is quite the reverse with one who has been chiefly using his brain all day, who has been trying to solve involved problems of one kind or another, and who has not used his muscles very actively. When night comes the brain and nervous system of such a person are apt to be unduly stimulated and he cannot relax immediately. Often he will lie awake for hours after he retires. He may talk in his sleep and be partially aroused during the night. The nervous system does not become entirely relaxed at any time. But the plowboy can probably secure profound sleep during the entire night.

Take a young person who is in contact with many people of different dispositions, who is in a large, complex school for

several hours each day, who has parties to give and to attend, whose home is in a more or less excited state constantly because of the complicated life which is streaming through it, — such a child is very likely to become overstrained. He may have "colds" or indigestion, or a fever, but the fundamental cause is nervous overstrain.

The chief cause of overstrain

In remedying this condition, the first point to appreciate is that overstrain results from the effort to adapt oneself to too many and too complex situations. Every reader of these lines has probably at some time had the experience of having half a dozen problems pressing upon him for solution at the same time. His attention was drawn first here and now there, and again in another direction, and he could not go forward in any direction because he was in the hands, so to speak, of conflicting and competing ideas and desires. He was literally torn by mental conflict. So long as competing or conflicting ideas prevent one from working through first one problem and then another, he will be tense and he will feel strain and stress. Some persons, children as well as adults, are able to deal with complicated situations much more easily than other persons, because they have the power of shutting out every problem but the one they are working on at the moment. When the one in hand is solved they take up the next one, and so they go; and they do not worry about their tasks. Such persons will be likely to get through a relatively large amount of difficult mental work without overstrain. But persons who do not have the power to work on one problem at a time and keep all others out of their attention will probably become overtaxed if they are plunged into the complexities of present-day city life.

In preventing overstrain in a child, then, we must limit the number of problems that press upon him at any moment. This is always an individual matter. The parent or the teacher who knows the child can alone determine how complicated a life he

can live, — whether he can do all the work of his grade in school, whether he can participate in competitions and contests, whether he can endure all the examinations that are ordinarily given in the school, and whether he can take part in outside activities, — practice music for instance, and attend parties. Some children can do all these things and not show overstrain, while other children would be broken in trying to carry through so complicated a program.

There are so much and so many kinds of work to be done in our country that many feel they should exert themselves to the utmost. There are so many subjects to be mastered in the schools that pupils are being taught under pressure. In towns and cities, at any rate, there is unceasing motion. Not only are human beings running here and there under full steam, but the streets are crowded at all hours of day and night with noisy, swift-moving vehicles. The automobile has increased the pace in American life, and it has already exerted an influence upon the nervous condition of the people. It has increased the feeling of restlessness. In many places there is no longer any quiet. Neither adults nor children see anything at rest; and people tend to reproduce in their own actions whatever lack of poise and composure they feel in their environment.

The need for periods of quiet

The home and school should make an attempt to counteract the exciting influences of the street. At certain periods, every pupil in school and every member of a family should be quiet. Young and old alike should learn to sit still. It will not accomplish much, of course, merely to tell children to keep quiet; this is more likely to accentuate restlessness than to subdue it. But if someone will tell or read a captivating story every day, or describe an interesting event or object or natural law, so that all who hear it will listen and be still, it will prove an excellent discipline and a restorative for the nervous system.

It is peculiarly unfortunate that the voices of American parents and teachers often increase the tension and excitability of the young. A high-pitched, rasping, loud, restless voice will overstimulate the majority of children within its reach. Even adults cannot listen quietly to such a voice. On the other hand, a well-placed, well-controlled, modulated voice is soothing to an overwrought nervous system. One who will make observations can see persons who are tense and restless becoming calm under the influence of such a voice. Parents and teachers should keep this fact in mind, for one can control the quality of his voice to some extent. If he allows himself to become tense the evil effect will be apparent in his voice, which is delicately responsive to one's mental and nervous condition.

Something could be done in the school, too, to offset the lack of poise in the life outside. In the Montessori schools there are brief periods of quiet each day. A signal is sounded on the piano, the room is darkened, the children become relaxed and quiet They remain so for a little time; then another signal is sounded, the room is made light again, and the work progresses. Every schoolroom should have several brief periods during the day when the pupils should relax. There is no danger of overdoing relaxation in American life. The danger is on the other side, — that there will not be enough of it, no matter what program we may follow in the effort to secure it.

Wasting nervous energy in the home

There are practices in many modern homes which lead to waste of energy. According to the fashion in many households, infants of a few months as well as children of maturer years are permitted to be in the presence of the older members of the family much of the time. Guests always expect to see the baby, to hold it and to stimulate it in various ways to see how prettily and intelligently it reacts. This practice would not be so objectionable if it were not that when the average adult has a little child in his arms he

is usually intense and restless in voice and actions. Few people seem to appreciate how much such treatment taxes the nervous strength of an infant. But let an older person imagine what a strain it would be to have excited people about him constantly, tossing and patting him, and making all manner of facial and vocal demonstrations for his entertainment. How much more it must wear upon a child to whom these things are new and strange, all arousing strong emotions of fear, curiosity, or excitement.

The teased child

It is not alone the trials of meeting strangers that are extremely fatiguing to young children, but the experiences with parents and other members of the family are often as exhausting. The young child, with its fresh, innocent ways, is not infrequently regarded as a plaything for the entertainment of its elders, and so is teased and tormented in one way or another, because its responses are so novel and interesting. Of course, parents would not call such treatment teasing, but it is precisely what it amounts to from the child's standpoint.

Here is a scene which is typical of much that may be observed in one's environment if he has occasion to look for it. A certain child disliked to have anything touch its nose, and would make the liveliest efforts to dispel whatever came in contact therewith. The sweet baby movements were naturally amusing to an adult, who did not see anything in them but fun for himself. Frequently some mature person, who knew the child's characteristic in this regard, would place a finger or other object near the delicate member, to see the little one strive with arms, head and body to drive it off. On one occasion a woman, whose years should have taught her better, was seen to tantalize the child for some time, until finally it became fatigued. When it grew restless and began crying, it was grabbed up, tossed and thrown about, and talked to in a loud voice. This violent stimulation overcame for the moment the child's impulse to cry, but

had the effect further to fatigue it, which was shown later in continual crying until it fell asleep. If one will think of such things going on day after day throughout the early life of the child, the irritable, unbalanced, disagreeable children of one's acquaintance may be accounted for, at least in part.

The writer recently had opportunity to study with some care the effect which a woman possessing a high-pitched, irritating voice and intense features and manner, but otherwise of most estimable characteristics, had upon a little child. Whenever she was near H. she insisted upon taking her, and she thought the proper mode of entertainment was to shake and toss and pat her, and make a great amount of noise and ado over her. As a consequence a half hour of such treatment was enough to fatigue H. for a whole day, and her disposition at such times would be quite changed from a happy, good-natured child to one easily irritated and satisfied with none of her ordinary pleasures. A nervous, irritable parent will be apt to nag his children, to be constantly forbidding or commanding them, and this will arouse emotions which will draw off nervous energy very rapidly. Antagonism is a breeder of nerve tension and some children seem hardly ever to be free from it during waking hours. The principle applies to the schoolroom as fully as to the home.

Finally, noise seems to have an exciting effect upon an individual at all times, even when he is asleep. It appears that there is in the mind a sort of memory of earlier racial experiences where noise was a most significant affair. An animal that could not awaken instantly upon sounds of howling or crackling or crunching or heavy breathing in its vicinity would have little chance of escaping from enemies lurking everywhere. And now, although man is quite safe in an environment of any amount of noise, yet he has not fully outgrown this old racial tendency to be alert when he hears noises. The effect of noise upon a sleeping subject has been

Noise as a nervous irritant

studied by Lombard and others, and the results seem conclusive in showing that even a slight noise causes a decrease in peripheral blood supply as shown in the accompanying illustrations, indicating that the blood is flowing in increasing quantities toward the brain, which tends to return to the waking state. In the

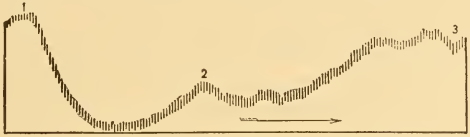

FIG. 33. — Plethysmographic record from the arm of a person sleeping in the laboratory. A fall in the curve indicates a decrease in the volume of the arm. The curve is to be read in the direction of the arrow. 1, the night watchman entered the laboratory; 2, the watchman spoke; 3, watchman went out. These changes occurred without waking the subject. — DONALDSON.

first hours of life an infant will jump with fright if one speaks in a harsh voice near him, or if a door slams, or if any other loud noise plays on him. So when older children hear noises on the street they are excited, and are impelled to action of some sort. How a drum will stimulate a child! A drum may

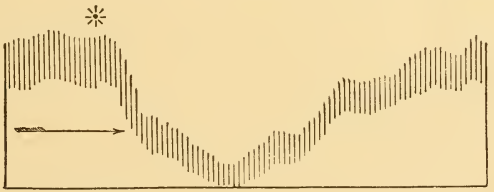

FIG. 34. — Record similar to that above. Change in the volume of the arm of sleeping subject, caused by the sound of a music box which was started at *. — DONALDSON.

be a cause of overstimulation if used too continuously, and the same is true of all noise-making toys. A barking dog in a house with children will be likely to excite them greatly. The writer has observed the effect on several children of three loud-barking dogs who gather about them whenever they go out to

play. The children are continually excited and show that the experience is fatiguing.

Psychologists have recently been making tests to determine the effect of noise on attention and on the rapidity and accuracy of intellectual work. They have found that while many persons can work as rapidly and as accurately in a noisy as in a quiet place, when they perform tasks that require action mainly rather than reflection, still in all cases they exert more effort when they work under noisy as compared with quiet conditions. They may not know they are expending more energy, but experiments have shown that this is true.

How is such a matter as this tested? This is one way it is done: a subject is performing a task in which he looks at exposed letters and presses a particular telegraph key according to the letter exposed. This task can be complicated in all sorts of ways, so that he will have to translate the exposed letter into a code, and that into a figure, and that into a color, and then he will press the proper key. He will perform this task when everything is quiet, and then later he will perform it when there are noises of various kinds about him. An electrical apparatus registers his performance so that it can be determined with accuracy whether he is hindered or helped by the noise. Also, this electrical apparatus indicates precisely how much force he puts on the key when he presses it. He does not know that his effort is being recorded. He is simply performing the task as best he can without being aware of the effect which the noise is having on him. In many tests of this kind individuals showed the effect of the noise in increased tension. Nature appears to say to one in a noisy situation, — "You are being disturbed. You must resist distraction. You must therefore exert yourself. Expend more energy so that you can perform your task and not be hindered by this noise."

There is another interesting fact revealed by these experiments.

When noise disturbance occurs most subjects articulate their tasks. This assists them apparently to resist the disturbance. When they begin to articulate, the breathing is affected. It is possible in these experiments to record accurately the effect upon breathing. The results indicate that noise arouses the resisting forces in one's organism, and this means that he is trying to stick to his work and not be diverted by the noise around him.

The practical outcome of such experiments is clear. Persons who work under noisy conditions waste energy. One can often see the effect of this on teachers who have charge of noisy schoolrooms. The tensions developed by the noise are often revealed in the features and in the voice, and unfortunately these tensions not infrequently lead to nervous depletion.

Also, one can observe the effect of noise disturbance on the pupils in a schoolroom. If they do the regular work of the school they are required to expend much energy to resist the disturbance, and so they are more readily fatigued than they would be if they were working under conditions of quiet. The same is true in the home. When a child is trying to study and some one is pounding on the piano, or a dog is barking, or there is other disturbing noise, he inevitably wastes energy. He develops tensions which tend to become fixed, and so lead to habitual dissipation of energy. Probably one who is accustomed to work under noisy conditions can do so with less waste of energy than one who has had no experience of this sort; but at the same time it is likely that one can never reach the point where noise will have no effect on him.

Overstrain in the schools

During the past decade a great deal has been said, alike in the educational and in the secular press, regarding overpressure in education. Physicians and educators have noted with apprehension the apparently increasing number of pupils in the higher schools who are deficient in that vigor and robustness of body and mind which are essential for

success in the battle of life. We are told that nervous diseases are much more frequent in youth to-day than they were a generation ago, and the fault is often said to lie with the schools. This feeling has been so marked and widespread that many investigations have been prosecuted in Europe, and to some extent in our own country, for the purpose of ascertaining the true condition of affairs respecting the amount of work required of students, and the effects thereof. Thus far little of final value has been attained; but yet the conviction is deepening in the public mind that education is too much of a forcing process, which makes demands upon energies that should be saved for the use of vital organs during their growing periods. Physicians have been urgent in their demands that the work of the schools be lightened. Key, in his "School Hygiene," is emphatic in his statements that the children of Sweden are seriously overtaxed. Nesteroff makes similar statements with reference to the Russian school children. Ballantyne, of England, declares that the English children are being seriously injured by overpressure in the schools. In this connection one recalls Spencer's indictment of the English schools, made over a quarter of a century ago. Schuyten and Lobsien found that the fatigue curve rises significantly with school children from September to July, and falls off at holiday times. Oppenheim is unsparing in his criticism of the present régime in our own schools. Keating, after long experience with diseases of children, finds that many of them have their origin in excessive strain incident to school work, and he, too, insists upon reform.

An attempt has been made to determine the amount of study which may be safely undertaken by a pupil at different stages in his progress through the schools. It must be apparent, however, that it is impossible to formulate any general law respecting this matter. Individuals differ so greatly in the amount of energy which may be expended in intellectual and physical ac-

tivity that no rule could apply to all. Again, the kind of work done and the conditions under which it is prosecuted must exercise an important influence upon the prodigality with which energy is expended. It seems, though, to be the view of those most competent to form an opinion that children in the elementary school should not spend more than three hours a day in mental labor. This period may be gradually lengthened as the pupil develops, until the limit of not more than eight hours a day all told is reached in the high school or college.

It seems probable that the injurious effects of study upon the health of pupils, of which we hear so much, is due more largely to the unhygienic conditions under which the work is carried on than to mental application *per se*. During waking hours the mind must be constantly active in some direction; and if study can be done under proper conditions, it is probable that it will not be more fatiguing than other sorts of mental occupation. It is not so much a question of the amount of study as of the circumstances under which the study is conducted; except, of course, that if a young child spends ten or twelve hours a day in study he cannot meet the requirements of hygiene in respect to exercise and sleep.

The statement has frequently been made at educational meetings of late that children should be able to do all the work of the school day in half the time they usually devote to it, if their attention could be concentrated upon the tasks in hand. However this may be, it is probable that some of the time of the average child that should be devoted to exercise is wasted sitting in school seats. This it is mainly that weakens the constitution, and makes children unable to resist disease. Bancroft says that sitting, and particularly reading and writing, is abnormal, and is conducive to postures that restrict circulation, respiration and assimilation, the three fundamental biological processes. Prolonged examination periods work the greatest harm in the schools.

In the high schools and colleges, students often spend over their books as many as sixteen hours a day for two or three weeks at a stretch. The work is done under great tension, too, which makes it especially wasteful. There is need of reform in this respect.

Waste from excessively fine work

The implements children employ in their school tasks are often responsible for considerable needless drain upon the nervous system, — such apparently insignificant articles as writing pens, pencils, and the like. Peripheral coördinations fatigue children, and it may be adults also, more readily than coarser activities. Thus, fine needlework is, hour after hour, more fatiguing to most women than washing dishes; and "getting pigs out of clover" is a greater strain on most men than playing golf or croquet; though habit and taste are, of course, important factors in these matters. In highly coördinated work much energy is apt to overflow into by-paths, so to speak. On the other hand, the fundamental coördinations have become so facile in the individual as a result of racial inheritance that they can apparently be performed without waste. When a boy is washing his slate one will notice fewer wasteful tensions and actions than when he is trying to write in a finely coördinated way; and the principle seems to have universal application.

The position here taken is by no means fully warranted by experimental evidence, and there are those who maintain that through habit the individual may become as economical in the use of peripheral as of fundamental coördinations. The writer's observations, however, lead him to a different view. Adult students say that very fine microscopical work with exact representation in drawing always fatigues them more readily than coarse activities of any sort. Professors who write much say that a very fine-pointed pen used on highly-glazed paper or paper that is readily punctured is exceedingly "trying to the

nerves." The writer has been able to gain an item relating to this point from the experience of a distinguished physician in Buffalo, a specialist in diseases of the nose and throat. Some of his work involves very delicate operations requiring accurate coördinations of the fingers. He says he never undertakes such cases except in the morning hours, when he is at his best; and after a relatively short period he is generally fatigued, so that he feels it necessary to secure rest before continuing with his duties. On the other hand, a half day's work in his general practice, which does not involve such exact coördinations, will not overtax him.

Unnecessary tension in writing

If you allow a child of seven or eight to write with a fine-pointed pen, in a short time tensions in various parts of the body not employed in the writing will be observed. Often the tongue will be extended, the hand not engaged will become clinched, and the head will begin to keep time with the arm. On the other hand, if a pupil writes with chalk at the blackboard he will be able to continue for a longer period without overstrain. One will be impressed with the wastefulness of delicately coördinated activities undertaken too early, if he will observe the effect of requiring young children to do fine sewing or weaving or any work of this sort, whether in the home or in the school. In some nurseries the young are provided with small toys and fragile objects that have to be handled with care, and such children appear never to be either vigorous or happy in their play. There is usually a good deal of petulance and irritability in these nurseries. It is recognized, of course, that with the development of the nervous system greater delicacy and complexity of coördinations become possible with less waste; but yet it is probable that the average individual never reaches a point where he can economically undertake intricate coördinations where coarser ones would answer just as well.

Pupils write on the average from one to two and one half

hours daily, and it is a matter of prime importance for them to do this work with the least waste. The less energy that is spent in manipulating the pen the more that will be left for the elaboration of ideas to be expressed by its aid. Fine-pointed pens are, at least for young children, an abomination. So are hard lead pencils, especially when used on glazed paper. Perhaps the most wasteful implement of all is the common penholder, *a*, in the illustration. The fingers grip the small metal part *m*, perspiration readily accumulates, and the pen tends to roll in the fingers. To overcome this the holder is gripped more tightly, with serious results in the squandering of energy. In *A*, the part *c* is of cork, and is relatively much larger than *m*. It absorbs the moisture from the fingers, and so is managed without so great tension. The same principle applies to lead pencils. A highly-glazed surface involves waste because it cannot be managed without excessive tension of the peripheral muscles. Slates are probably the most wasteful of all the appliances of the school. "Scratchy" pens cannot be too severely condemned. Aside from their irritating influence upon the nervous system, they require such careful handling that waste of energy cannot be obviated. Gold pens are generally much better than steel, for they can be handled in a rougher way without abrasion of the paper; and steel pens corrode easily, the points thus becoming rough, which prevents easy manipulation.

Concerning pens

FIG. 35. — Illustrating different styles of penholders.

In *a* the part *m* is metal, usually tin, and is of small diameter.

In *A* the part *c* is cork and is of a considerably larger diameter than *m*.

A answers the purpose of economy much better than *a*.

Most children make hard work of writing with a pen; the technique is unnatural to them. Adults do not as a rule remember their own struggles in acquiring the art of writing. The majority of educated adults write automatically for the most part. They are unconscious of the rules, regulations and restrictions which must be observed in making letters accurately and æsthetically. Even if they are accomplished penmen, they are not as painstaking in their handwriting as they were required to be when they were pupils in the elementary school. Teachers often insist that their children must write with precision and finish. Even so, it is exceedingly difficult and often impossible for a child before the teens to control his hand and finger movements so that he can make his letters of exactly the proper heights, spacings and slant. This is one reason why he dislikes so much to write a letter or a composition.

Teachers will not as a rule allow pupils to enjoy the swing, the freedom, and the individuality in handwriting which are regarded as desirable qualities in the writing of adults. A study of the penmanship of a large number of grown persons shows that they usually cut off angles and abbreviate all complex movements. That is, under the stress of expressing themselves they economize as much as possible in the mere mechanics of penmanship. Most of us think faster than we can write, and we tend always to shorten the process of making letters. Writing is a much slower and clumsier means of expression than speech, but we often economize even in the use of words, as when we cut off *ng*'s, and clip words in other ways. This abbreviating process, with elimination of unnecessary technical detail, is especially marked in handwriting.

The technique involved in typewriting is simpler than in the case of handwriting, and it is not so burdensome to the child. The movements required to operate the keys are much like those he is making frequently in his finger, hand and arm activities in

every-day life. The rules and restrictions which must be heeded in typewriting are more easily observed than in the case of pen-writing. Adults have testified that while they have not been able to make the use of the pen entirely automatic, even after many years of drill, still they have attained this facility with the typewriter after a comparatively short period of training. Take a thousand children chosen at random, and it is probable that ninety-five per cent of them would learn to write with the typewriter more easily and rapidly than with the pen.

The typewriter is less wasteful than the pen

There is an added advantage in the use of the typewriter. If those who are reading these lines will close their eyes and picture words, they will find that their pictures are mostly in print forms, and not in script forms; that is, we tend to think of words in terms of type rather than of script. We can then more readily determine whether a word written on the typewriter is spelled correctly than when it is written with the pen. Further, in cases of doubt in spelling, we can more easily recall printed than written letters in their proper order, so that writing with the typewriter is of greater assistance to the child in learning to spell than is writing with the pen. A child can also correct error more easily in typewriting than in pen-writing.

There are other minor advantages in the use of the typewriter. The pupil can arrange his written work more attractively on a page with the typewriter than with the pen. Typewriting is more readily perceived than pen-writing, and so is easier on the eyes. Again, in the use of the pen a young child usually "bears on." He is apt to develop wasteful tensions in the fingers which control the pen. Often a pupil is fatigued when he uses a pen for ten minutes, especially if it has a fine point and if the holder is made of metal. All these difficulties are largely avoided in the use of the typewriter. Ordinarily a better position is maintained in writing with the typewriter than with the pen. Nine out of

ten children feel the strain of pen-writing; they bend over their task, and in fact put their whole nervous and muscular system into it. This is the chief reason why pen-writing is exhausting for many children, and for many adults also.

It does not seem practicable yet to furnish typewriters for all children in public schools. But parents who can afford it should provide typewriters in their own homes. Children who do school work at home should so far as is feasible prepare it on the typewriter. This does not mean that the pen should not be employed at all; it is necessary, of course, to teach children to write with the pen, because they will have need to use it when the typewriter is not at hand. But it would be better to put the emphasis upon typewriting rather than upon pen-writing in the early years particularly.

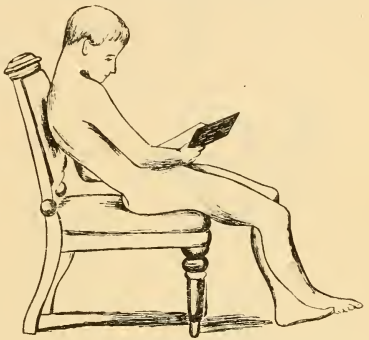

FIG. 36. — A posture frequently seen in the home and in the school. (See exercise 6, page 377.)

Needless muscular tensions wherever they occur must be regarded as squandering vital force. The body in either a standing or sitting position is, of course, acted upon by gravity, and if it be out of plumb it tends to fall. This catastrophe can be averted only by the action of muscles which pull against gravity, and so serve to keep the body in equilibrium. Imagine then a person standing for some time in such a position that gravity has a leverage on him, and his muscles are acting vigorously to keep him from falling; it is plain what this entails in loss of nerve force. Pupils, or

Postures that lead to waste of energy

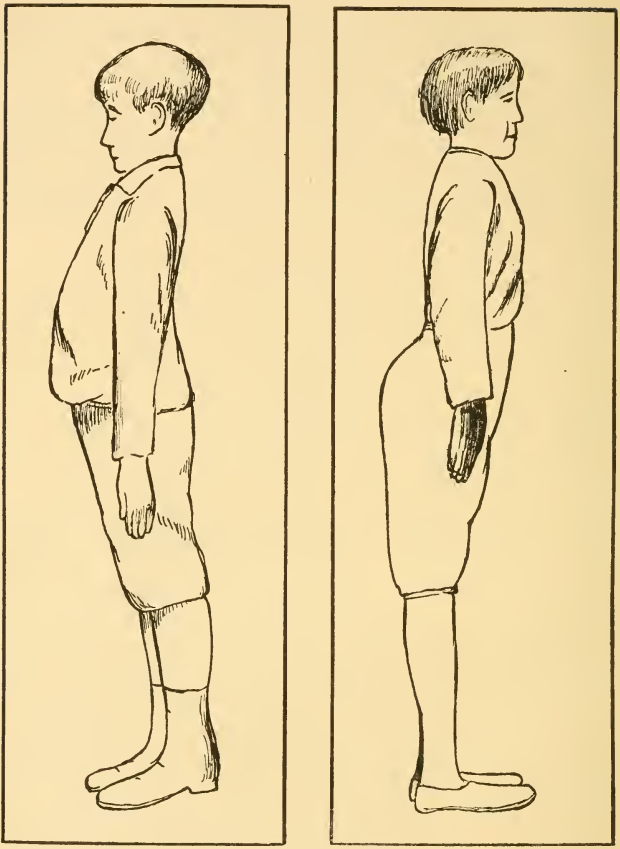

FIG. 37. — Overdoing the effort to maintain erect posture. (See exercise 6, page 377.)

adults either for that matter, who do not habitually stand or sit so that the body is well poised and there is no undue tension, will suffer for their error in lessened efficiency in both physical and mental work.

A teacher recently said, "I never allow any of the pupils in my room to get into slouchy positions. When they first come in here they take every kind of position, both in their seats and when they are standing to recite. But they soon learn that I will not tolerate anything but a good position."

Rigid posture

What is a good position? It is certainly not a rigid one, because rigidity wastes energy. Rigidity also distracts attention, so that a tense person cannot concentrate on his work as he otherwise would do. Let any reader who doubts this make an experiment. Let him stand with his heels together, his shoulders pressed back, eyes to the front, hands stiffly at the sides. Let him try to solve a problem when he is in such a position. He will discover that his attention is constantly reverting to his muscles, so that he cannot follow a train of thought very far.

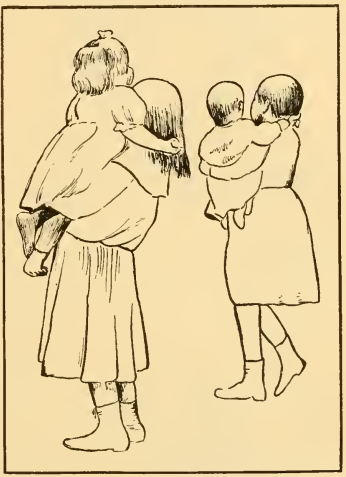

FIG. 38. — Bones are easily molded into deformed positions during the growing period. (See exercise 6, page 377.)

It requires fine judgment to determine in how far children should be allowed to take "natural" positions, and in how far they should be trained to sit and stand erect. The untrained

child tends always to assume relaxed positions. If he be let alone to go his own way he will fall into slouchy habits often, especially when he is sitting. But unless he be permitted to adopt a relaxed posture occasionally, he will be likely to become too tense

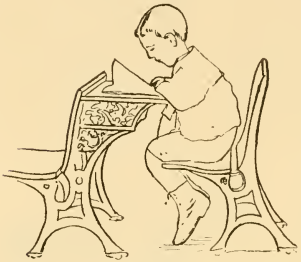

FIG. 39. — Illustrating a very common fault in school furniture, a too high seat. The child is unable to rest the limbs on the floor and leans over on the desk for support.

FIG. 40. — Illustrating an evil posture very common in schools where the seating is imperfect.

and his rigid muscles may be a handicap to efficient mental activity.

It is possible to maintain a healthful posture in which the organs will have freedom for their proper action and at the same time not be rigid. This is what a teacher should strive for in the training of his pupils. He should try to train them to be at ease whether they are sitting or standing.

FIG. 41. — Illustrating a too small distance between the seat and desk, causing pressure on chest and stomach.

It requires time to develop poise in children, but it can be done. The greatest factor in developing poise is emulation; if one be in the presence of a well-poised person he unconsciously imitates him to a greater or less degree. A

typical individual could not be brought up among well-poised people and be slouchy or rigid himself. We all imitate the

FIG. 42. — Illustrating a desk and chair too small for pupil's size, causing cramping of the lower limbs.

FIG. 43. — Illustrating too great a space between the seat and desk, causing pupil to stoop too much, inducing round shoulders.

carriage and bearing of people about us more readily than we do their other characteristics. A well-poised teacher will not need to say much about posture to his pupils. An occasional suggestion or perhaps a gesture will be enough. He will not make all his pupils as well-poised as he is himself, but he will start them on the way to acquiring good posture.

This subject is of consequence not simply from the point of view of conserving energy, but it concerns as well the generating of force. A pupil leaning over his

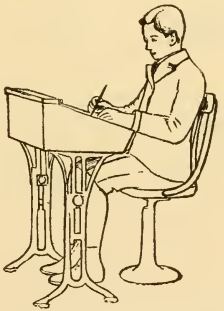

FIG. 44. — Chair and desk illustrating proper seating of pupil.

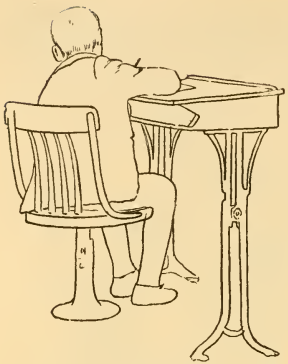

FIG. 45. — Illustrating a desk too high for the child, causing elevation of the right shoulder in writing and a corresponding curve in the spinal column.

desk, with his lungs constricted, is in a good condition to encourage day-dreaming and napping. In such circumstances, the organism is apt to become clogged since it does not receive its due allowance of oxygen, as a result of which the brain will slow down in its action. Who has not seen a room full of seekers after knowledge, lying down on their desks, with all vital processes impeded, and their minds in a kind of stupor? People sometimes put themselves to sleep by deliberately assuming the attitudes which school seats often enforce upon pupils.

When one reflects upon the matter he can hardly fail to be impressed with the remarkable intricacy of the motor coördinations required in the proper control of the eyes. During waking life they are well nigh incessantly changing their focus, for one thing, so as to bring within range of vision objects located in different parts of the visual field. In order to accomplish this they are equipped with ocular muscles so adjusted as to secure movements in all directions within a given orbit. In the perfect eye these muscles are exactly balanced and remain at rest except when the interests of vision require action.

The eye in relation to nervous waste

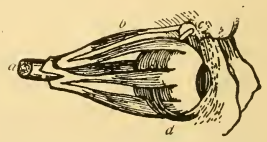

FIG. 46. — Muscles of the eyeball. *a*, optic nerve; *b*, superior oblique muscle; *c*, pulley; *d*, inferior oblique muscle. The other four muscles are the recti muscles.

But it happens often that one of the ocular muscles may be more energetic than its fellows; or through some error in the functioning of the reflex nervous mechanism it may be active when it should be at rest. It tends then to pull the eye out of focus, which would make one see double if it had its way; but the nervous system seeks reflexly to avert this calamity by stimulating a muscle opposed to the overacting one so as to counterbalance its efforts.

Maladjustment of ocular muscles

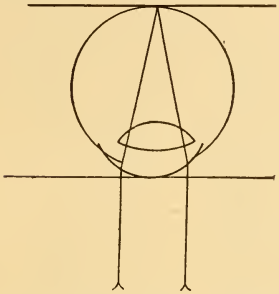

FIG. 47. — The normal eye. The eyeball is just the right length and the lens has just the right degree of curvature so that the rays of light are focused precisely upon the retina.

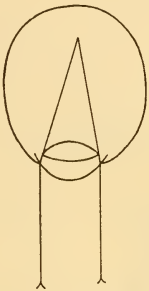

FIG. 48. — The shortsighted or myopic eye. The eyeball is too long so that the rays of light focus in front of the retina.

Nature strenuously endeavors to correct all defects of this character. As Prentice says:[1] "When necessary, the nerve centers enervate to their utmost power the various eye muscles, causing a change in the crystalline lens, stretching muscles which were too short to enable the eyes to look in the same direction." This results then in incessant muscular strain, which is a constant source of waste. Gould maintains[2] that "the tremendous influence of eye-strain upon disposition, character, and vocation was borne in upon me the first year I was in practice. Almost

[1] *The Eye in Relation to Health*, p. 10.

[2] *Biographic Clinics*, vol. I, p. 28.

every day since then the truth has become more striking and evident. Children's lives and minds are unconsciously and constantly modified, always unnaturally and morbidly, because of the fact, unconscious to them, that reading and study and writing irritate and disorder the central nervous system, the digestional organs, etc."

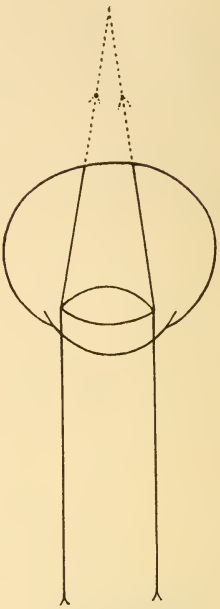

FIG. 49. — The longsighted or hyperopic eye. The eyeball is too short and the rays of light focus back of the retina.

Maladjustment of the lens

Again, in the normal eye the lens and eyeball are so constructed that objects are with ease focused exactly upon the retina. But it happens more frequently than not, it seems, that this fine adjustment is not secured. The lens has not the right degree of curvature, as a whole, or in a certain angle, or the eyeball is either too short or too long, when the focus falls in front of or behind the retina, or is not the same in every meridian. The various defects of the eyeball are shown in the accompanying illustrations, figures 48 to 60, while the normal eye is shown in figure 47.

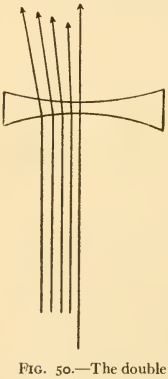

FIG. 50.—The double concave lens. Notice that it spreads the rays of light and so can be used to correct a short-sighted defect, as shown in the following illustration.

In a more or less reflex way the individual tries to remedy any error of the sort shown in the illustrations by modifying the curvature of the lens through the action of the ciliary

muscles. In a defective eye this strain must go on incessantly, and one can easily imagine the results in draining the organism of nerve force. We have been hearing during the last few years that the defective eye is the source of much discomfort and disturbance; and even if its importance in pathology has been somewhat exaggerated it is nevertheless universally conceded that defective vision entails serious consequences, alike in blocking one important approach to the mind and in robbing the system of energy. Swift, in the *American Physical Education Review*, 1899, gives a number of examples of disturbances in various parts of the body, due directly to eye-strain.

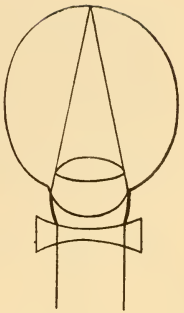

FIG. 51. — The only way to correct shortsightedness, — using a concave lens so that the rays of light will focus exactly upon the retina.

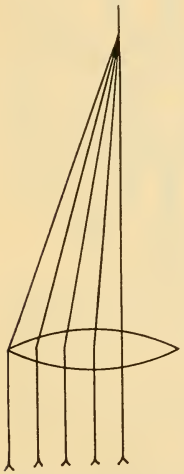

FIG. 52. — The double convex lens. Notice that it converges the rays of light, and can be used to correct longsightedness as shown in the following illustration.

Dr. Gould on the effects of eye-strain

Gould, in his interesting study of the causes of the ill-health of some of the great men and women of history, — Darwin, Huxley, the two Carlyles, Spencer, Wagner, and many others, — maintains that eye-strain was responsible for most of their maladies. In discussing De Quincey's ill-health, he makes a statement which will be in place here: "It is one of the greatest of unutilized truths," he says, "long known, strangely ignored, that in the vast majority of cases of eye-strain the morbid results of the astigmatism, etc., are not felt in the

eyes. It is perfectly explainable why this is so. The value of the eye so overtops that of almost any other organ that the reflex results of its unphysiologic functions must be shunted anywhere except back to the eye itself. In women it goes to the head; the world is full of those tortured nearly every day of their lives with headache ('bilious' or 'nervous' headaches). In many, and especially with men working much with the eyes, the reflex is

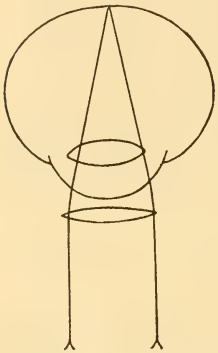

FIG. 53. — The only way to correct longsightedness,— using a convex lens, so as to focus the rays of light on the retina.

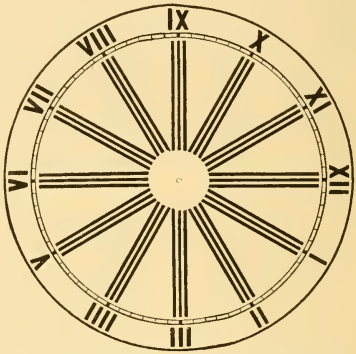

FIG. 54. — The astigmatic dial. A perfect eye will see all the lines equally black and distinct.

to the digestional organs, with 'indigestion' and 'liver derangements,' 'anorexia,' etc. The truth that eye-strain induces these functional gastric, intestinal, and biliary disorders cannot much longer be ignored." [1]

Eye defects seem to manifest themselves especially during adolescence. Many boys and girls realize now for the first time that they have eyes. The explanation doubtless is that the organism is devoting its strength during this period mainly to

[1] *Biographic Clinics*, vol. I, pp. 34–35.

the building of heart, lungs and bones, and there is not enough left to expend in disciplining refractory eyes. In sickness people become conscious of eye-strain that they have not noticed before, and of which they are never really aware except when the energies of the organism are at a low ebb. Swift observed this phenomenon frequently in his study of vision in the pupils of the normal school at Stevens Point, Wisconsin. "An interesting

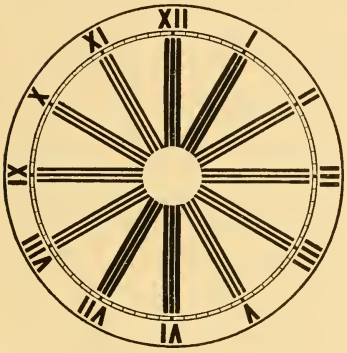

FIG. 55. — Showing astigmatism. A person who has astigmatism is likely to see some lines more distinct than others. In this case the distinct lines are VI and XII. In other astigmatic eyes any of the other lines may be more distinct.

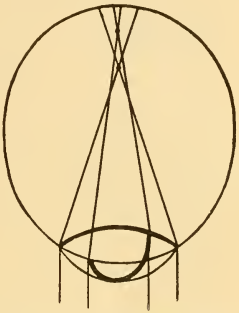

FIG. 56. — A shortsighted astigmatic eye. The rays of light are focused at different distances in front of the retina. This means that the individual sees more clearly in some meridians than in others, though vision is blurred in all meridians.

fact," he says, "though by no means a new one, was repeatedly observed. Young boys and girls, with more defect than some older ones, had never experienced any trouble with their eyes, while the older ones, with much less defect, were constantly annoyed with eye ache, or the blurring of the letters. The difference was that the vigorous nervous system of the young boys and girls was able to sustain the irritation of the poorly constructed eye, and by an oversupply of nerve force, could compel

the eye to do its work without apparent injury, while the more exhausted nerve centers of the young men and women could not stand the constant call for more energy."

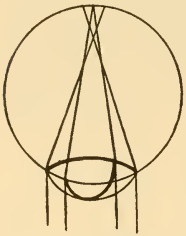

FIG. 57. — Another type of the shortsighted astigmatic eye. Note that the rays in one meridian focus exactly upon the retina, and in another meridian in front of the retina.

The only way the defects of sight which have been mentioned can be corrected is by the use of glasses. If one is shortsighted the optician will grind a glass so that it will bend the rays of light before they enter the eye just enough so that when they pass through the lens they will be focused upon the retina and so will give normal vision.

If one is longsighted the glass must be ground so as to bend the rays of light in the opposite direction from what is required in shortsightedness. In astigmatism the glass must be ground differently in different meridians, according to the particular type of defect.

People often act as though they thought that if they let a child with eye defects alone he will outgrow them in time, but this is rarely the case. The opposite is more likely to be true. The use of a defective eye is apt to increase the defect through unnatural strain; and defect in vision always causes eye-strain.

It hardly need be added, perhaps, that no one but a well-trained specialist is capable of prescribing glasses. For one to wear glasses suggested by a quack may lead to the destruction of the eyes.

In progressive schools to-day regular examination is made of children's teeth. It is not taken for granted that parents will

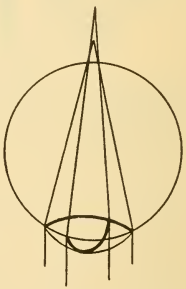

FIG. 58. — The longsighted astigmatic eye. Notice that all the rays of light are focused at different points behind the retina.

look after this matter properly. Records have been kept in a number of cities, and it has been found that as high as twenty per cent of the children in the first grade suffer to a greater or lesser extent from decaying teeth. In the higher grades some medical examiners have reported that from thirty-five to forty-five per cent of the children either have decaying teeth or have some serious deformity due to the improper development of the teeth.

Importance of the teeth in relation to conservation of energy

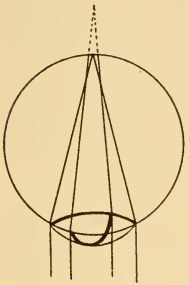

FIG. 59. — In this astigmatic eye the rays in one meridian focus exactly on the retina and in another meridian behind it.

Neglected carious teeth are almost certain to interfere with health and with good mental activity. Such teeth are always the cause of more or less acute pain. A child suffering from even a "dull" toothache cannot concentrate upon his intellectual tasks. Since teachers and medical examiners began to give attention to this matter a large number of cases have been reported of children who appeared indifferent in the schoolroom, who made mistakes frequently, who often did not hear commands which were given, who could not even copy work from the board correctly, and the cause was found to be mainly decaying teeth. There are on record numerous instances of dull and inattentive pupils who showed marked improvement when their teeth were put in order.

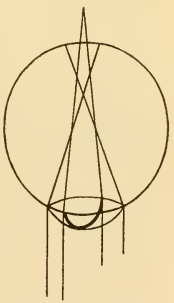

FIG. 60. — In this eye the rays in one meridian focus in front of the retina and in another meridian behind it.

A more serious fact still is that neglected decaying teeth are practically certain to become breeding places for germs. The poisons

developed by these germs are likely to be absorbed into the blood and to become the cause of disturbance in some part of the body. Many school children are in a toxic or poisoned condition all the time, partly because of the toxins developed in diseased teeth. Physicians have quite generally come to realize that infected tonsils may be the source of disease through the absorption of the poisons which are thus developed, but it is probable that more children are poisoned by carious teeth than by diseased tonsils, serious as the latter may be.

Further, neglected decaying teeth generally interfere with the mastication of food, so that it is often swallowed without being chewed. Children have always a tendency to bolt their food and this tendency is aggravated when the teeth are sloughing away. The proper action of the digestive system requires that one should chew hard food of some kind at every meal, preferably hard-baked bread or biscuits; but this may not be possible when the teeth are not sound and strong.

When all these conditions are operating in any one case, as they sometimes do; that is to say, when the child's teeth are aching, when they are developing toxins which are absorbed into the system, and when they cannot be used to masticate hard food, then the situation for the victim is always serious. No child of any age can meet the requirements of present-day life in school or outside when he is handicapped to this extent. He will be distracted in the school; he will not have energy to do his work properly; he will be among the first to take any disease that is going, because his resistance will be lowered. These statements are warranted by the results of investigations which have been carried on during the past few years in many of the cities of this country.

It is unfortunate that nature has not equipped the child with an instinct to care for his teeth as he should do, so that they will resist decay. When nature gave man his teeth she expected

that he would use them in crushing hard, raw food, and so he would of necessity keep them in good condition all the time. Unhappily, in present-day life the young, and the old also for that matter, eat mainly soft, mushy, semi-liquid foods, and so the teeth are not used in a way to keep them in health and vigor. For this reason they ought to be massaged every day. Nothing but vigorous treatment will keep vitality in the teeth of children who are reared on soft foods. This is being appreciated by observing teachers, and in some places they have a special period which is devoted to what is called "The Toothbrush Drill." Children march in groups to running water and there use their toothbrushes in an effective way. There are objections to this on æsthetic grounds, and unless care be taken there might be objections on hygienic grounds; but for many children in the public schools to-day the exercise is a beneficial one so far as the teeth are concerned. With proper care of the brush, or whatever scrubbing and massaging device is used, there will be no danger of contagion; and considering the tremendous advantages to be derived from this competitive drill, teachers can probably endure the offense to their æsthetic sensibilities.

Avoiding needless friction

It is recognized in mechanics that a large part of the energy expended in the operation of a machine is lost on account of friction; a relatively small amount even in the best machines is used in accomplishing the purposes for which the machine is operated. The more perfectly a machine can be constructed so as to avoid loss of energy the more efficient the machine is, of course. Viewed from one standpoint, the human body is a machine; it has work to do and it has a certain quota of energy which may be utilized for this purpose. Some persons seem to hold that the human organism has been so carefully fashioned that there can be no loss of vital force, that all parts fit together so smoothly and coördinate so nicely that there is no leakage anywhere. It would

be a fortunate arrangement if this most intricate of all mechanisms could automatically run without waste of energy. It is probable, however, that with the majority of persons, on account of wasteful habits contracted in one way or another, there is loss of force by friction, which can be reduced, at least, by intelligent planning.

The statement made by William James that most people use only a small part of their available energy has special significance in this connection. Before the World War broke out, several German books appeared which ascribed the increase of suicides and nervous derangements among school children in that country to overstrain from excessive school work. Offner's book on mental fatigue summarizes a vast amount of investigation in many countries, and in the entire book there is not one intimation to the effect that educational systems are not requiring excessive work of their pupils; but it is probable that it is excessive *waste* rather than excessive *work* which is the cause of overstrain in the school.

Loss in the human machine from muscular tensions

One of the most important sources of waste of energy is found in muscular tensions which are not at all essential to the accomplishment of the work in hand. When any task, such as writing, is to be undertaken no muscles should be active except those which are necessary to the execution of the task, or that furnish an outlet for surplus energy. Take this case, a common one: an adult sets out to write a letter; he seizes his pen in his right hand, and soon the left hand becomes clenched, the lips compressed, deep furrows appear between the eyes, and the fingers grasp the pen with undue force. In such a case a considerable amount of energy is being expended without profit; the unnecessary tensions are draining the organism of force that should be conserved.

There are practices in school life, as in the life outside, which result in squandering energy, as we have seen, and which

can probably be corrected without inducing too great self-consciousness. In the first place, mental tension readily begets muscular tension. When one is troubled in spirit; when he discerns obstacles ahead that seem insuperable; when conscience is incessantly active, censuring one for past deeds, exhorting him to be especially careful in the future; when life seems full of cares that demand unceasing attention, — such a state of mind produces tensions which sap the organism of its vitalities. Life abounds with illustrations of this principle. The cringing of any animal in terror; the distension of the nostrils, clenching of fists, trembling of the whole frame in anger; the dynamic attitude of the speaker whose subject possesses him, — all are common examples of muscular tension produced by mental or emotional tension. An old football player testifies that he cannot put on his "togs" without experiencing muscular tension to the point of marked unsteadiness of the hand.

Mental tension begets muscular tension

Persons with rigid countenances and tense muscles may frequently be seen on the street, in the home, or in the schoolroom. When one talks with such persons he can observe "nerve signs," that is, signs of overstrain, in all the sensitive muscles of face and hands. These are the persons who are continually drawing too heavily upon their nerve accounts. Their outlay often exceeds their income; and there may never be any large balance on the credit side of the account. Dr. Clouston, the eminent Scotch neurologist, visited our country a few years ago and is reported by William James to have said:[1] "You Americans wear too much expression upon your faces. You are living like an army with all its reserves engaged in action. The duller countenances of the British population betoken a better scheme of life. They suggest stores of reserved nervous force to fall back upon, if any occasion should arise that requires it. This

[1] *Talks to Teachers*, etc., chapter on "The Gospel of Relaxation."

excitability, this presence at all times of power not used, I regard as the greatest safeguard of our English people. The other thing in you gives me a sense of insecurity, and you ought somehow to tone yourselves down. You really do carry too much expression, you take too intensely the trivial moments of life."

It is a vitally important matter in every one's life, and especially in the early years when habits of economy or prodigality are being established, to get into the way of adjusting effort to the task to be accomplished. Manifestly the first requisite is to adopt sane mental attitudes toward life and one's work. One who is constantly apprehensive and self-condemnatory pursues a good course to dissipate his forces, for he cannot be looking inward all the time, reviewing his limitations and errors, without inducing strain and stress of mind and body. As James has said, the "melancholic patient is filled through and through with painful emotions about himself. He is threatened; he is guilty; he is doomed; he is annihilated; he is lost. His mind is fixed as if in a cramp on this sense of his own situation." And unfortunately, the more one thinks of his failings the more securely do they tend to fasten themselves upon him. Let one review the occasions on which a lapse of memory has embarrassed him, whether it be forgetting a name when in a gathering, a part prepared for a public exercise, or something that "would not come" till after the examination, and he will find that almost always the thought of the possibility of forgetting came first. One can rise above his limitations mainly by filling his mind with ideals outside of himself so that he may grow up toward them. This is the only way, too, in which the machinery of life can be adjusted to run without needless friction.

Professor James' advice to those who are continually in a self-condemnatory or fearful frame of mind may be repeated here:

"If we wish our trains of ideation and volition to be copious and varied and effective," he says, "we must form the habit of freeing them from the inhibitive influence of egoistic preoccupation about their results. Such a habit, like other habits, can be formed. Prudence and duty and self-guard, emotions of inhibition and emotions of anxiety have, of course, a needful part to play in our lives. But confine them as far as possible to the occasions when you are making your general resolutions and deciding on your plans of campaign, and keep them out of the details. When once a decision is reached and execution is the order of the day, dismiss absolutely all responsibility and care about the outcome. *Unclamp*, in a word, your intellectual and practical machinery and let it run free, and the service it will do you will be twice as good. Who are the scholars who get 'rattled' in the recitation room? Those who think of the possibilities of failure and feel the great importance of the act. Who are those who recite well? Often those who are most indifferent. *Their* ideas reel themselves out of their memory of their own accord. Why do we hear the complaint so often that social life in New England is either less rich and expressive or more fatiguing than it is in some other parts of the world? To what is the fact, if fact it be, due, unless to the overactive conscience of the people, afraid of their saying something too trivial and obvious, or something insincere, or something unworthy of one's interlocutor, or something in some way or other not adequate to the occasion? How can conversation possibly steer itself through such a sea of responsibilities and inhibitions as this? On the other hand, conversation does flourish and society is refreshing, and neither dull, on the one hand, nor exhausting from its efforts on the other, wherever people forget their scruples and take the brakes off their hearts and let their tongues wag as automatically and irresponsibly as they will."

James on "unclamping"

The reflex effect of bodily attitudes

While economical bodily attitudes and activities are generally insured by mental poise, still something may be accomplished on the motor side by deliberately striving to relax occasionally. Let one who is conscious of unnecessary tenseness in his muscles voluntarily "let go" at certain times of the day as a matter of discipline. This will assist in relieving his nervous system; and in time he may find

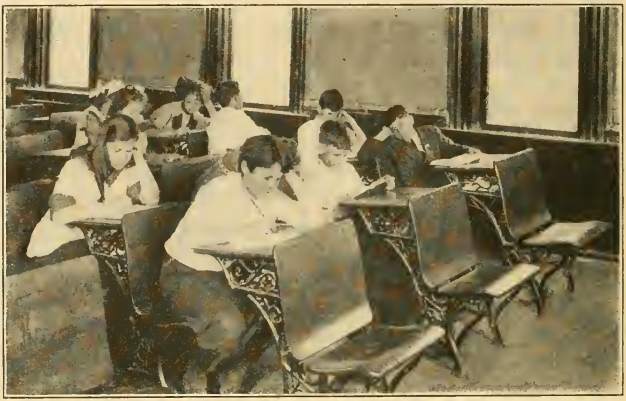

FIG. 61.—Postures often determine mental states, and *vice versa*. (See exercise 26, page 381.)

himself relaxing unconsciously, which is an imperative need for the majority of American people.

Just as ideas and feelings find their way into motor actions, so motor attitudes influence the current of one's thought and feeling. Deliberately assume any given motor attitude and it will tend to awaken the emotion which usually initiates this attitude. Assume the outward manifestation of fear and fear will be easily engendered; while if one stands bravely against the world, courage will be strengthened. In the words of

Ribot : [1] "It is less generally known that movements and attitudes of the body, artificially produced, are capable (in some cases, and to a slight degree) of exciting the corresponding emotions. Remain for some time in an attitude of sadness, and you will feel

FIG. 62. — Seating can be arranged so as to secure an erect posture. (See exercise 58, page 386.)

sad. By mingling in cheerful society and regulating your outward behavior in accordance with it, you may awaken in yourself a transient gayety. If the arm of a hypnotized subject is placed, with clenched fist, in a threatening attitude, the corresponding impression spontaneously appears in the face and in the rest of

[1] *The Psychology of the Emotions*, p. 392.

the body; the same holds good for the expression of love, prayer, contempt, etc. Here the movement is the cause and the emotion the effect. The two cases are reducible to a single formula. There is an indissoluble association between a given movement and a given feeling."

Play as a restorative

It seems to be a principle of our human nature that what we like to do, speaking generally, produces less strain and stress than the things we dislike. Disagreeable tasks lie along the lines of greatest resistance for the organism, so a relatively large amount of energy must be expended in overcoming them; while on the other hand, what is agreeable runs along ways of easy progress, and makes comparatively little demand upon our powers. Bearing upon this matter, Galton has said:[1] "We must be on our guard against estimating a man's energy too strictly by the work he accomplishes, because it makes a great difference whether he loves his work or not. A man with no interest is rapidly fagged. Prisoners are well nourished and cared for, but they cannot perform the task of an ill-fed and ill-housed laborer. Whenever they are forced to do more than their usual small amount, they show all the symptoms of being overtasked and sicken. An army in retreat suffers in every way, while one in the advance, being full of hope, may perform prodigious feats."

This doctrine is of vital consequence as it affects programs for relaxation in and out of school. Games, plays and gymnastics which one enjoys will accomplish the purpose of recreation better than those in which one has no interest. So far as possible the will should be released in recreation. This is accomplished more largely in play than in mere drill, as in marching or anything of the kind. Things which we dislike we must exert ourselves to overcome, but it is different with those activities which draw us spontaneously. Observe a boy at play and at work. The

[1] *English Men of Science, Their Nature and Nurture*, p. 75.

play may really be harder, in the sense that more gross energy is expended and more difficult movements are performed, but yet he is really less fatigued over the heavier than the lighter task.

Relaxation is the important thing in recreation, viewed alike from the standpoint of the conservation of power and recovery from fatigue. Claparêde believes that the only real way to rest is to do nothing, — to *rest*. Offner also takes the ground that the short hourly pauses of fifteen to twenty minutes during the day at school are really of benefit only if they are spent in relaxation, taking nourishment, or in the fresh air, not in gymnastics or violent exercise. Pupils and brain workers of every kind will probably be benefited more by exercises requiring the greater use of the fundamental than of the peripheral muscles. Gymnastics and games, then, should not require too exact and difficult coördinations, since it would seem that the school really demands enough of this sort of thing in the prosecution of the regular studies. It is also desirable that a pupil's amusements should engage the muscles principally rather than the mind. Cards, checkers, chess, and the like are poorly suited to the needs of those who use their brains constantly in their regular employments. A pupil's life economically planned would be so ordered that he would expend in study all the energies which should be devoted to intellectual activities, while recreation would involve motor processes almost wholly.

Quiet indoor games vs. boisterous games for relaxation

A teacher in a Western city inquires whether quiet games such as checkers, backgammon, authors, chess, and the like do not make a good substitute for boisterous games out-of-doors. She says: "There is a movement in our city to provide rooms for these quiet games in some of the churches, in the schools, and in the library. A small room can accommodate quite a good many children, and an arrangement like this would provide for the recreation of children without so much expense. The people of this

city do not seem to favor the plan of having large out-door spaces for games. Will not the quiet games teach children to be self-controlled and at the same time furnish the relaxation which they need, as well as the boisterous games?"

Any adult who thinks that checkers or authors or any game of the kind will afford relaxation equal to out-door games might make an experiment of playing chess or checkers or whist

FIG. 63. — The Fairhope method of inducing children to relax. (See exercise 64, page 388.)

for an hour one day and note the effect upon muscles, nerves, and mind. Then the next day spend an hour out-of-doors playing tennis or golf or any ball game, or if this is not practicable, walking for an hour, and then compare the effects with those derived from chess or checkers or cards of any kind. There may be an occasional person who will say that the quiet games furnish as good recreation as the out-of-door games which use the large muscles, but where there is one such person there will probably be a hundred others who will declare that the "boisterous" games are more relaxing, refreshing, and upbuilding.

What does relaxation require? When nerves and muscles become tense, nature urges one to release them. If they remain tense too long they will dissipate energy and lead to nervous exhaustion. Any experience which will restore ease and equipoise to a tense nervous or muscular system will afford relaxation. Now, most of the tensions of modern life, whether in the schoolroom or outside, arise from mental strain and stress. A child who studies arithmetic for thirty minutes, for example, is apt to develop tensions which can often be observed in the expression of the features and in the constraint of the body. It is probable that all mental effort results in some tension. Some teachers appreciate this, and they do not require pupils to apply themselves to any study but for a short period at a time. In good schools pupils have exercises at frequent intervals which change the set of nerves and muscles, and so are relaxing. No teacher who understands the requirements for relaxation would expect that after a child had studied algebra for a considerable period he could find relaxation best in playing checkers. The competitive element in the game would arouse his interest, but his application would increase the tensions developed by the preceding study.

The meaning and requirements of relaxation

Children in modern city life are made tense not only by the work in the school, but wherever they go they are likely to be overstimulated. There is so much life and movement and complexity in our modern cities that a child is hardly ever free from tensions. He cannot go along a street without being on the alert all the time. Every succeeding year brings increased alertness in order to protect oneself. Life in the city does not require much use of the fundamental muscles; the senses and the brain are principally employed in adjustment to urban situations. The pace in the school is becoming constantly faster because there is more to learn and more to do each succeeding year. This all means increased tension. It also suggests that in

order to keep balance and harmony and to avoid fatigue and breakdown there must be periods of boisterous play. There must be running, yelling, climbing trees and ladders, jumping, wrestling, playing tag games, and all chase and catch games; also swimming, skating, coasting, snowballing, and so on.

It is particularly desirable that all children should have op-

FIG. 64. — There should be one room in every large school building equipped with facilities suitable for relaxation. (See exercise 64, page 388.)

portunity for throwing stones, snowballs and the like. Every normal child has a passion to throw; and this is one source of trouble in city life, and is the cause of many domestic conflicts. The child's remote ancestors survived partly because they could send missiles through space upon distant objects, — their enemies or their prey. We have got past the necessity for this in modern life for protection against enemies or for the securing of food,

but the old racial practice tends to be repeated in our children. When children are keyed up as a result of stress and strain in the school or outside, they will usually be relieved if they can go out-of-doors and engage in a throwing contest, either in throwing at a mark or at one another in competitive games, or in throwing a baseball or a volley ball. Driving a golf ball appeals to this fundamental interest, but it is more complicated and so less recreative, for most people at any rate.

So quiet games should not be made a substitute for the outdoor, muscular games mentioned above. Does this mean that the quiet games are of no value? It does not. Under some conditions, as when young people have had two or three hours of the outdoor, boisterous games, the quiet, intellectual games would be appropriate and might be of value. Some parents train their children early to play whist and similar card games. Any child who devotes much time to this sort of game will be handicapped. If he is doing vigorous intellectual work in the school or in the home he will not find the whist relaxing.

There are indoor games, of course, which require the use of the large muscles and which are genuinely relaxing. All the ball games, especially with large balls, meet the requirements for relaxation, unless they are played in too intense a way. Sometimes young people play basket ball, for instance, vigorously and become so excited in the competitive struggle that it does not furnish relaxation for them. But when the excitement is not too intense it is an admirable game, vastly better for brain workers of any age, and for people who live in a city whether they are brain workers or not, than games like whist or chess. Bowling employs fundamental muscles and relieves a tense brain, but it does not make so strong an appeal to most persons as a team game like basket ball does. There is probably no better exercise for relaxation than swimming, and fortunately swimming pools are now being put into school buildings and occasionally

into churches. A half-hour of swimming will afford better relaxation for a school child than a whole day of games like checkers.

Modern biological psychology conceives of a human being as most delicately responsive, alike in a mental and in an organic way, to every aspect of his environment. All his experiences affect him for better or for worse; every force that plays upon him probably heightens the tide of life or depresses it. Pleasure and pain furnish the data by means of which one distinguishes between the beneficial and the detrimental forces acting upon him. Those that yield pleasure are on the whole salutary; those that yield pain are on the whole harmful; and for prosperity it is essential that one's pleasures should be kept more abundant than his pains. Pleasure results from a condition of congruity, and pain of incongruity, between the organism and its environment.

All experience affects one for good or ill

CHAPTER XIV

OVERSTRAIN IN EDUCATION: CONDITIONS AFFECTING ENDURANCE

If an untrained runner starts off at full speed he will in a short time become "winded." He will slow down and he may come almost to a stop. But if he keeps trying, he may gradually pick up again and he may regain something of his original speed. This is known as the "second wind." **Handicaps to endurance**

The energy which is expended when a muscle is at work is derived from the combustion of food in the body. The residue or ash resulting from this combustion is in effect a sort of poison in the system. If this worn-out tissue accumulates in a muscle it will interfere with its action. That is, the muscle will become fatigued; and it cannot resume its normal action until this toxic or waste material is removed.

The lethargy of aged persons is due in considerable measure to the heaping up in the system of these toxic materials. Nature provides organs for the neutralization and elimination of toxins, but with some persons, quite generally with elderly persons, these organs are unable to perform effectively all the work that is assigned to them. The case is aggravated if a person habitually takes toxic matter into his system in his food or drink. All flesh foods contain a greater or less amount of ash, and a person who is a heavy meat eater is usually in a "tired" condition much of the time. Also a heavy tea or coffee or beer drinker is generally in a toxic condition and so is easily wearied.

Often one sees persons in middle life who play out on slight

effort of any kind. If they go for a walk, they soon become "winded," and they may not be able to go a tenth of the distance that others of their age can go without complaining of being "all in." These persons who become tired very easily are usually burdened with uneliminated toxic matter.

Why people differ in power of endurance

A group of boys who try out for positions on athletic teams in a high school or college usually differ markedly in their power of endurance. One may lose his wind quickly, while another may keep going in good form for a relatively long period. In the first case, the individual is deficient either in breathing capacity or in the activity of the eliminative organs, or he has superfluous flesh, or his system is so full of toxins that a slight exertion will overbalance the breathing and eliminative mechanisms, and he will soon slow down or stop altogether. But the individual who can hold out a long time without fatigue has trained his breathing and eliminative organs so that they will quickly respond to heavy demands made on them. He has accomplished this probably by daily practice in which he has pushed a little farther every day until he has reached his maximum. The organs can be trained in this way so that they can support prolonged and vigorous action. On the other hand, if the organs have not been trained gradually to perform lively and prolonged tasks, but if they are called upon now to do so, they will not be equal to the occasion; and what is more serious, they will be likely to suffer from overstrain.

Take a man, for example, who has not engaged in a foot race for a year, but in the meantime he has indulged his appetite generously, and now he goes to a picnic and takes part in a race. He may be laid up for days as a result of overstrain simply because he called upon his muscles and vital organs to do work for which they were not prepared. If he had trained up by degrees for the race he could probably have engaged in it time

and again and would have been fresh and vigorous the next day. He would not have had a sore muscle or a sensitive heart.

The law holds for the brain as fully as for other organs. A pupil can be trained to do hard and prolonged mental as well as physical tasks without fatigue or any ill consequences. But if he be out of school for six months or so, working with his muscles, and then be plunged into mental tasks demanding long endurance he will be likely to suffer some nervous disturbance. If he start gradually and go a little farther each day or each week he can train the brain and nervous system so that they will sustain comparatively long, hard application without being injured or overcome by it.

Training for mental endurance

One of the purposes of education should be to lead the young to keep themselves fit, alike for physical and for mental tasks. A boy who lies around the house during vacations engaging neither in vigorous physical exercise nor mental occupation will probably become flabby in body and mind. When he is required to perform a physical or mental task of any importance, he will be likely to find that he is unfit, and exertion of any kind may incapacitate him for some time. Children need to have the notion implanted in their minds also that they cannot keep fit if they take toxic matter into the system by the use of tea or coffee. Heavy indulgence in candy or sugar usually makes one unfit. More serious than any of them in lessening endurance, in a young person at any rate, is tobacco. Nature shows that tobacco is an enemy of the immature organism, for when the boy first employs it he is usually made sick. Nature tries to develop immunity to it if it be continually used, and while she succeeds, better in some cases than in others, she probably never develops such resistance to nicotine in an immature boy that it does not act as a handicap in endurance. Men who train athletes are well aware of this fact.

The first requisite, then, in developing endurance is to keep the

organism free from toxic matter. If we could preserve a toxin-free organism it could continue in action without overstrain so long as it could secure food and oxygen to furnish energy. Many of those who become fatigued most readily have superfluous flesh which could be used to develop energy if the eliminative organs could be utilized. Young persons should early be helped to think straight in regard to this matter.

Training can be overdone

Training for endurance can, of course, be overdone. A boy could go so far in the development of his lungs, heart and other organs that he would have to keep up very vigorous exercise throughout his life or his over-developed organs would degenerate. Athletes are frequently overtrained. A few years after they leave college they may suffer from fatty degeneration of the heart, or from diseases of the lungs or other vital organs. If the heart has been developed to endure very strenuous tasks, it must continue to be so used or it may deteriorate. If the lungs have been expanded to the full in training and after a time are only half used, the parts that are left idle are likely to become diseased. The same principle holds for all the organs. One's training, then, should not go much, if any, beyond his needs in mature life. If the training is less than his needs require, he will be handicapped in the race of life. If the training is much in excess of what his needs require, he will be subject to degeneration of the over-trained but little-used organs.

"Off days"

Dr. Dearborn, of Tufts Medical College, has recently directed attention to the daily variation in the amount of energy which a pupil can draw upon in accomplishing the work of the school. He has brought forward a considerable amount of technical evidence indicating that an individual may not have as much energy for work on one day as he will have on another day, though there may be no apparent cause for this variation. When his energy is low, an individual will not per-

form his tasks with interest and vigor, and at such times he will make progress very slowly.

Dr. Dearborn maintains that we are warranted in saying positively that all individuals, children particularly, have their "off days," when little may be expected of them, and when hard work should not be demanded of them. He makes the practical suggestion that school duties should be so planned that pupils may do their work when they feel in trim for it, and be permitted to vegetate when their energies are low and they have to be urged to apply themselves to their tasks. Undoubtedly there is an important principle here which the teacher should recognize and observe, so far as may be expedient; but it seems that this matter may easily be carried too far. Viewed from one standpoint, every day is an "off day" for many pupils in respect to much of the work which we think they should do for their own welfare. This means that the attractions of the schoolroom are not so enticing as the activities of the playground and the street, and the seduction of the moving picture show and the baseball park. Let the typical pupil from seven to twenty years of age follow his own course and he will shy off from most of the tasks of the school. However, if these tasks be made concrete and dynamic; if a motor element be introduced into each study so far as this is practicable; if the competitive element be brought into the work of the school, so that to some extent it will have the aspect of a game, then the pupil will attack it with greater readiness than he otherwise would. But even so, it will probably be necessary to urge pupils on many occasions to apply themselves to tasks which we think will be of service to them in mature life.

It seems probable that most of the "off days" which any pupil is likely to have may be eliminated by vigorous exercise of will. An observing adult cannot fail to note that he has "off days" himself, but by reasonable effort he is often able to

change them into active days. Modern research has made it seem probable that every person possesses a certain amount of latent energy which cannot be drawn upon except by energetic effort of will. A well-trained person can undoubtedly decrease the number of his "off days." Of course, not much can be expected in this direction in childhood; but an adult could not gain the power to utilize this latent energy unless throughout his developmental period he had some experience in so doing.

Surely no greater misfortune could overtake any individual than to be brought up on the principle that he need never apply himself to any task unless it attracts him at the moment. It is a matter of common experience that unattractive activities at the start may become fairly attractive by keeping at them until they make a positive instead of a negative appeal. And when the pupil has had successful experience in converting negative into positive interests, he will be establishing an apperceptive basis for continued success in the future. This is really what is meant by a strong, capable personality; it is one in whose past there have been so many achievements in accomplishing tasks that have been neutral or positively distasteful at the moment that the sense of conquest has become established, and the individual feels that he can convert these neutral, distasteful tasks into positive and agreeable ones.

Of course, this does not release the teacher from the necessity of striving to win his pupil's attention by the attractive character of his work. Even then there will be tasks enough to afford every pupil experience in attacking problems which at the moment do not make a positive appeal to him. Again, the teacher should recognize that in every pupil's life there will be days when tasks cannot be performed with as great readiness or pleasure as at other times, and due allowance must be made for this slump in work; but nevertheless the teacher must hold the pupil for reasonable effort every day, encouraging him to do

his best to win out in his enterprises. As he grows older he may be depended upon more and more to regulate his own efforts; but as a child, dominated by primitive interests which are for the most part wholesome but which are not adequate for mature life, he must be guided, controlled, and even urged to establish other interests which in time will come to rule over the primitive ones. It is practically certain that the pupil will not accomplish all he should in this direction without some pressure from his environment and especially from his teacher, who sees the road he must travel if he would reach his proper destination.

New times bring new problems

The following complaint of a New York woman presents a problem which is troubling a large proportion of the people of this country:

"In my family there is something wrong. In my father's family there were eleven who lived to a good age; in my husband's father's family there were seven; in his mother's family there were eight, strong and vigorous. Their parents evidently got along well with their work, while I am often overtaxed in caring for three children, none of whom is very strong. I see the same condition of affairs all around me, even though families are growing smaller. The doctors say "Get more fresh air, sleep with open windows, eat simple food." At the same time we may look around and see foreigners with as large families as ours used to be crowded into small, poorly ventilated shacks, eating the poorest of unhygienic food. For instance, an Italian babe may be quieted with an ear of green corn that would give ours the colic, and yet they are strong and vigorous."

The law of economy in developing and maintaining organs

In commenting on the situation described in this letter it may be noted first that nature is economical. She husbands her energies carefully in constructing a human being as in all her undertakings. She will not develop or maintain large muscles, for instance, when one does not use or need them. She will not keep the teeth in repair if they are not required to grind hard food.

If one should bandage his eyes, he would lose his vision, simply because nature would not maintain the very delicate mechanism required for sight.

Again, nature always aims to construct and maintain organs so that they will be best adapted to the special work they are required to do. One can see this illustrated in the case of animals. For example, take a horse which lives out-of-doors in winter. Nature develops a thick fur as a protection against wind and weather. Now put this same horse in a warm stable, and cover him with a blanket every time he is taken out-of-doors. Feed him oats and prepared food instead of straw. Nature will then say: "This horse does not need a heavy fur. The skin does not need to be toughened. Therefore I will maintain only a thin fur, and will leave the skin sensitive. I will not keep the digestive organs so vigorous either, because they will not need to take care of coarse, innutritious food."

When a man protects his high-bred horses from wind and weather he reduces their resistance to cold and hard usage. Take a horse which has been so protected for part of the winter and fed on prepared food, and then turn him out suddenly to the straw stack. He will perish. Nature cannot change her program overnight.

This law of nature applies to human life. Our remote ancestors had greater biceps and leg and jaw muscles than most of us have now. They needed them in their business. They were in competition with the beasts of the forest; and in a life of this kind muscle is the chief requirement. We of to-day have in a sense declined physically. And why? Because nature has concluded that over-sized biceps and leg and jaw muscles will be a handicap rather than a help to most men now since intelligence has come largely to take the place of muscle. A cave-age man living in a modern town or city, or even in most places in the country, would have pains and diseases a great deal of the

time. His big muscles could not be utilized, and nature would try to reduce them.

Men who work hard up to sixty, or so, and then stop, go to pieces rapidly in the majority of cases. Nature appears to say: "What is the use of keeping up these muscles, these digestive and eliminative organs, and these mental faculties now that the man has no need of them?" And she proceeds to get rid of them; which means that the man degenerates.

Organs that are not used tend to degenerate

The most serious aspect of this matter is that nature always penalizes decay of organs. What she has built up she does not like to have destroyed. If she has developed big biceps, for instance, and a man does not use them and they begin to deteriorate, they will become a source of aches and pains. The same is true of every muscle and every organ. Nature is seen here in a double rôle; she endeavors to eliminate organs that are not needed in the individual's activities, and at the same time she heaps penalties upon him when he permits his organs to decay. This is the reason why most men who live an intellectual life take physical exercise of some sort, even though they may detest it. In any large university there are hundreds of men who would like to spend every moment of waking life at their intellectual tasks, but they must take an hour or two each day merely to exercise their muscles and stimulate their vital organs so as to keep them from degenerating.

Nature is apparently exalting the mental factor in human life. She is using parents, teachers, ministers, legislators and others to accomplish her purpose. Parents desire their children to be educated so that they may win a livelihood by their intelligence rather than by their muscles. Teachers are working in the same direction.

Intelligence is in the ascendancy

A person could spend his life in a single room to-day in most parts of the civilized world, and still be in contact with the whole

world by means of the telegraph, the telephone, the newspapers, and so on. He could accumulate wealth without leaving his room. He could direct the operation of armies of men without seeing them. The man who can issue his commands and make inquiries by telephone or telegraph will push ahead of the one who has to go on his own legs to communicate with persons and do his errands. The man who gets to the top to-day is

FIG. 65. — Outdoor calisthenics. (See exercise 9, page 393.)

the one who makes his head do the work which formerly had to be done by arms and legs.

Suppose one could bring a denizen of the woods or the plains into a modern city, and require him to live in the way that most city people do. He would probably soon begin to decline. He would become afflicted with consumption or hardening of the arteries or rheumatism or some other degenerative disease. Nature would have developed his body and mind for the out-of-doors, for dealing with crude physical conditions, and she could not overnight make the change demanded for adjustment to

city life. In the same way, take a person who is adjusted to city life and send him out on the frontier to shift for himself and he will probably be eliminated.

Reverting now to the story told by the New York woman regarding the lack of robustness in her family; there is nothing the matter with her family which is not the matter with the majority of families in present-day American life. This woman is bringing her children up in a "refined" manner. She would not let them live in the rough way in which the children of poorer families live. She protects them for two reasons: in the first place, she wants them to be more delicate, to be better dressed, to look better cared for and to be more polite in their actions than her neighbor's children are; in the second place, she thinks they will be better off if they are safeguarded than if they are left to eat coarse food and to be lightly clad and dirty. But when she makes her children "refined," she robs them to some extent of their power to combat disease due to exposure. It is exactly the same in principle with an individual as it is with a highly-bred race horse; refinement is secured at the expense of endurance of crude, harsh experience. There is no escape from it.

The price of "refined" training

This mother probably prepares her children's food carefully. Their dietary doubtless includes mainly soft, delicate, tempting foods. She would not think of limiting her children principally to hard bread and milk and vegetables. But these latter are just the articles that are eaten by the poorer children which this woman says are healthier than her own. The poorer children may have better teeth than the richer children, provided, of course, that they make use of the toothbrush. They can eat coarse food without digestive disturbance, simply because vigor of digestion goes with a rough muscular life. The out-in-the-open children have rosier cheeks than the well-cared-for indoors children because they are exposed to rougher weather. Nature

has to send the blood to the skin to protect it against wind and storm. Persons who live indoors acquire pale cheeks because they do not need a different kind.

Hardening the body

The New York woman's children would probably have throat and lung trouble if they should get their feet wet, whereas the poorer children might have their feet wet every day and still nothing would happen to them. Why? Because they have become toughened through exposure. The

FIG. 66. — Vigorous competitive games develop endurance. (See exercise 9, page 393.)

Spartans deliberately hardened their children in this manner, and many a student of childhood from Locke down to our own day has advised parents not to "coddle" their children, but rather to expose them to a certain extent from the very beginning and develop their resistance to harsh experience.

A child who has not been allowed to go out-of-doors during November, December or January without a heavy coat and overshoes may catch his death of cold if he runs out by accident in February without protection, for the reason that nature has developed his whole organism on the assumption that he would always be protected, and she cannot change so important a matter as this in a day.

It would have been well if this woman had begun hardening her children from the start, not because they are to live a life of hardship, but because it is impossible to prevent some exposure during childhood and youth. A mother cannot always oversee her children, and they will expose themselves. On the way to school they will play as the other children do, most of whom will probably be more hardened than they are, and they will suffer for it.

If a child could be protected always from exposure there would be no great advantage in hardening him from the beginning. It is an exploded theory that one can harden a child in the first year, and that he will keep the resistance thus developed into maturity without any further training. Men who have been brought up in the country accustomed to all kinds of exposure lose their ability to resist disease in a very short time if they move into the city and live indoors.

One way to harden a child is not to over-clothe him, and especially not to over-feed him on soft, highly-refined foods. It is practically impossible to develop much resistance in a child who lives on mushes and white bread and sweets in the form of sugar and candy. A good way to make a child able to resist the effect of getting wet feet and wet clothing is to have him become accustomed to a cold-water shower or plunge or rub every day. This will develop endurance of cold water when it is encountered in the form of rain or thawing snow.

There is another side to this problem, as every investigator to-day knows. The children of poverty, ill-fed and exposed to hardships, often do not acquire endurance, but instead are destroyed. The abnormally high death-rate among children left largely to care for themselves is a menace in American life. If we were still living entirely under primitive conditions the neglected child might survive. But as a matter of fact, no child in a town

New social conditions make our problem a very complicated one

or city to-day can become innured to a life of great exposure because he must walk on cement sidewalks, breathe devitalized indoor air, and have his senses bombarded by the sights and sounds of modern life. He cannot adjust himself on the one side to the highly exciting, restrictive, and refining life of civilization, and on the other side to crude, primitive conditions. He is not doing it fully, as a matter of fact, as the statistics of child mortality indicate. Children must be protected to some degree while at the same time being hardened so that they can endure the sort of exposure that they are practically certain to experience sooner or later.

The chief requirement in modern life, so far as promoting the health of children is concerned, is improvement in community or public hygiene. Fortunately, we are making progress in this regard. A child of civilization cannot resist most contagious diseases as well as a primitive child can; but we are compensating for the loss of immunity by preventing the spread of contagious diseases so that children will not be exposed to them. Children in the city cannot endure rough, hard conditions in the schoolroom, but we are making good this loss, too, by constantly improving these conditions. This is all in the right direction, and we must persist in this work until our children in the towns and cities can have clean milk, clean air, room to play out-of-doors and hygienic conditions indoors.

Over-eating and under-cleaning

In some parts of our country the view prevails that a woman is a good housekeeper if she can provide "three square meals" a day. The reputation of boarding houses in such places depends upon the amount of food which is set before guests. The man of the house likes to be known as a good provider. In the towns and cities in these sections the chief talk of the residents concerns eating. When strangers visit the city they hear first about the eating-places,—the restaurants, the cafés, and so on. The chief favor which

a host can show his guest is to take him to a famous restaurant and "fill him up." Meat shops and grocery and confectionery stores predominate. The thoughts of people in these places are concerned very largely with their alimentary canals.

One would not find so much fault with this constant stress on eating if the people utilized the energy derived from the food consumed in keeping clean and in social service; but as a rule the more attention that is given to eating in a community, the less that is given to cleanliness and to the higher forms of social intercourse. The writer could take any doubter into houses in the localities mentioned and show him tables burdened with a great variety of rich food, from which the inmates would be gorging themselves three or four times a day; but there would not be one really clean room in any of the houses. The energy of the housekeeper and her assistants would be spent almost entirely in buying and preparing food. There would be dust all over the furniture. The carpets would not be thoroughly cleaned from one year's end to another; the only effort made to clean them would be to go over them superficially once in a while with a dry broom. This would stir up the dust, which would settle down upon the furniture, and some of it would lodge in the respiratory passages of anyone who was unfortunate enough to be in the room at the time. Places not conspicuously in view would not be touched at all with brooms or anything else. The back stairs and the back yard would be found filled with litter, the accumulation of weeks and months. Even the dishes would not be clean.

Outside the house one would find dust blowing from streets which are never thoroughly cleaned. In such communities people spend so much time in dining rooms that they cannot give proper attention to sanitation. Surveys made in some of these communities have shown that not even ordinary precautions are taken to secure milk and water free from disease germs. Such people are more eager to get an abundance of

milk than to get wholesome milk. It is so with all the food in such places. One can find food exposed on streets from which filth is constantly blowing.

What about the health of the people in these places, especially the children? The chances are that if you will take fifty children, chosen at random, over half of them will be coughing or sniffling or complaining of internal pains or suffering from skin diseases of some kind. In one community recently visited at least half of all the children in the schools were coughing, sometimes hard enough to disturb the school. In the homes of these children their coughs and stomach-aches were taken as a matter of course, arranged for in the divine program of child life.

Health and cleanliness

One who eats "three square meals" of rich food every day, with "snacks" in between, but who is not engaged in hard labor, makes a good host for germs. The guardians of his health are so busy getting rid of his excess food that they cannot successfully resist the invading bacteria, and the latter easily establish themselves along the respiratory tract or in the digestive system or on the skin of their victim. Any observing reader must have noticed that after a festival season the revelers are especially liable to germ diseases. It is usually the case that when students go home from colleges or preparatory schools during holidays and over-indulge in food and other dissipations, they return with nasal, bronchial and digestive troubles, all of them of germ origin. Records have been kept in some colleges and schools which show marked increase in bacterial diseases after seasons of over-indulgence in food and drink.

Teachers say their work is harder on Monday than on any other day in the week, because pupils are more restless and mischievous, and they do not learn so readily. One might expect just the opposite of this. Some would expect Friday to be the crucial day, because the pupils are

Blue Monday

fatigued from the week's work. But teachers' reports indicate that this is not the case. Records made of cases of school discipline show that as a rule pupils are better behaved on all other days than they are on Monday.

What can be the explanation? Is it not this, that for most children Sunday is a day of feasting, when it ought to be a day of fasting, or at least of temperance? As a rule — there are exceptions, but they are rare — children eat more on Sunday than on other days. Families that may live rather simply during the week often lay themselves out to have fine meals on Sunday. If they have cakes and honey, for instance, on one day of the week, it is likely to be on Sunday morning. Whatever other dish is especially inviting will be saved for this feasting day. The desserts will be especially rich and elaborate at Sunday dinner, and there will be sweets again, candy probably, at supper time.

Suppose a family have indulged on Sunday excessively in honey, maple sirup, hot cakes, hot biscuits, flesh foods, rich pastries and cakes, ice cream, candy, and possibly coffee and tea. Take the children of this family on Monday morning. The chances are they will be dull and irritable. They are so full of unassimilated food, and especially sugar, that neither mind nor body is in good condition. Follow such children to school, and you will find that they are likely to make life a burden for the teacher. This is one reason why Monday is a hard day for teaching and discipline.

How has it come about that Sunday is a feast day in most families? Like so many of our other customs, it is left over from a time when everybody worked hard for six days in the week, and there was not much danger of their over-eating on Sunday. But now that the majority of people eat as much as they need and a little more every day in the week, Sunday feasting is a source of a good deal of mischief. Our habits of

life will not permit without harm of such indulgence on Sunday as is common in American families. In the circumstances we should adopt the practice of making the meals on Sunday more of the nature of light luncheons rather than of heavy meals. Particularly tempting dishes ought to be reserved for the days on which there is likely to be a good deal of outdoor activity.

A large part of the effort of teachers in the schools of this country goes to waste on account of bad air in schoolrooms. The messages of ministers to their flocks produce but slight response because of bad air in the churches. Many of the sick in hospitals regain their strength slowly when they should recover rapidly, because of bad air; children and adults alike in many homes feel lethargic and are irritable because of bad air in living and sleeping rooms.

Energy in relation to indoor air

What is bad air? Nine out of ten persons think that air is bad only when it has been breathed over by human beings. It is believed then to contain a large amount of carbonic acid gas which is thought to be harmful to human life.

The following question was recently asked of a group of one hundred teachers: If you should open the windows of your schoolroom and leave them open long enough to change the air, could you then close them and have good air in your room for, say, a half hour? Nearly every teacher answered in the affirmative. The reason given was that there would be oxygen enough in the air to last for half an hour, unless the room were overcrowded. These teachers declared that the best plan to secure good air when it is not provided by a special ventilating system is to open the windows occasionally, and let in a supply of oxygen. This is the way in which most teachers who have to rely upon their own devices seek to keep good air in their schoolrooms. It is the plan followed also (when any plan is followed) by janitors in charge of churches, by housekeepers, and by most of those who have charge of buildings in which people, young or old, have to live.

During the last ten years a number of persons have been making careful investigations of the effect of different methods of ventilation upon the physical, intellectual and emotional conditions and activities of people. Subjects have been put in air-tight closets of different temperatures, different degrees of humidity, and different conditions with respect to the movement of the contained air. It has been shown time and again that when a person is encased in a room in which the air is not circulating, he experiences discomfort almost immediately. Soon he feels disinclined to effort of any kind. Before long he is likely to complain of dizziness and marked disturbance in other ways, and in a relatively short time he may collapse. If the temperature is at or a little above 70 degrees, if the humidity is high in the enclosed room, and if there is no movement of the air, the subject will very soon become incapacitated. If the temperature is at or a little below 65 degrees, and the humidity is also low, he will endure longer than in the first case. If the temperature is low but the humidity high, he will experience discomfort and be put out of commission sooner than if both the temperature and the humidity are low.

What are the requirements for good ventilation

Experiments have been made showing conclusively that if the air is not in motion in the closet, the subject will faint in a brief period, even when he breathes fresh air through a tube. That is to say, the mere breathing of pure air will not prevent discomfort, indisposition to effort, and final collapse. It is evident that air affects the body in other ways than through respiration, and that the amount of oxygen in the air is not the only important factor in ventilation.

Other experiments have shown that one may breathe air which has been breathed over a number of times in an air-tight compartment, and he will suffer no marked ill effects therefrom if the air is kept in circulation constantly. Oxygen comprises

about twenty-five per cent of outdoor air. Investigations have proven that it is practically impossible to reduce the amount of oxygen in breathed air below twenty per cent. The carbonic acid gas constitutes about four parts in 10,000 in outdoor air. It is difficult to raise this even in badly ventilated rooms above eighteen or twenty parts in 10,000. There seems to be something like an equilibrium maintained among the elements of air even in enclosed spaces. Oxygen will leak in through minute openings, and carbon dioxide will ooze out even through the ceiling and the walls of a room.

Now take a youth or a man to be tested, place him in an air-tight closet, and have both the temperature and the humidity high. If nothing else is done, he will soon have a headache, and begin to feel faint and dizzy. Before he collapses set the air in motion with an electric fan. Soon he will be revived. So long as the air is kept in motion, with the temperature and humidity high, he will be comfortable in an air-tight room. If the temperature is lowered at the same time that the air is set in motion, the subject will feel more comfortable than if the temperature remains high. If the temperature remains high, but the humidity is reduced, the subject will feel better, and be disposed to exert himself more than if the humidity remains high.

All investigations along this line have shown that one's comfort and his disposition to apply himself to physical or mental tasks and his capacity to accomplish work, depend very largely upon the coolness, dryness, and motion of the atmosphere, and not primarily upon the oxygen or other content of the air that is breathed.

People usually say they feel dull and perhaps have a headache on a hot, moist, still day. On the other hand, they say they feel invigorated, "like a new person," when the temperature drops and a breeze starts up. The same effects will be produced in the schoolroom, the church, the hospital, and the home as are produced out in the open when the atmospheric conditions

are the same. When summer passes and pupils are being shut up in closed and heated buildings, the chances are that "dead" air will be the cause of lassitude and physical and mental disability.

It seems to be invariably true that living things throw off toxic materials which must be removed or they will act as poisons. Crops must be rotated because the soil conditions produced by any crop are apt to prevent the development of another good crop of the same kind in immediate succession. The same principle seems to hold for the human body. It is constantly throwing off through the skin and the lungs substances which must be removed in order that the body may maintain its vigor and preserve its feeling of well-being. The body is a sort of furnace, for one thing, always generating heat. But at the same time a uniform temperature must be maintained or trouble will follow. This requires that there should be constant readjustment of the body to the temperature conditions in the environment. If the temperature of the surrounding air rises, the body must shut down its dampers, and open its flues and windows so that the surplus heat may escape. If the heat cannot escape, fever will develop, and soon the entire bodily machinery will be thrown out of order. If the temperature of the air drops suddenly, the windows and flues must be closed and the draughts opened. This fine adjusting and balancing is done in a reflex way, of course; and all the time the body is throwing off moisture in greater or less quantity according as it needs to get rid of or to conserve its heat.

The toxic effect of "dead" air

Now suppose that the body is enveloped in a layer of air which changes very slowly. This air becomes surcharged with moisture, and the temperature is raised. Sooner or later both the humidity and the temperature will be so high that the body will have trouble in getting rid of its surplus heat and moisture. The internal organs will be affected, and the whole body will

be put under strain. But let a fresh breeze come which will remove this layer of "dead" air, and at once the body will be restored, the surplus heat will be eliminated, the feverish conditions will decline, the headache will disappear, and the machinery of life will run smoothly again.

This is what proper ventilation primarily requires, — changing the layer of air next the body so as to prevent "dead" air from accumulating there. Of course, the air can change so rapidly, especially when the temperature is low, that the body is called upon to generate a large amount of heat in order to preserve the body temperature. If this temperature falls much below the normal, there will be trouble in plenty on hand. This puts an unnecessary strain upon the body, and requires its resources to be turned too largely into the making of heat, so that there will not be enough left to support action, either physical or mental.

FIG. 67. — The chief malady of the schoolroom is headache. (See exercise 10, page 393.)

From what has been said, it must be apparent that clothing plays an important rôle in the ventilation of the body. For illustration, observe the change which occurs in the actions of a boy who during the summer has been living in the open air without much clothing, but who when September arrives is enswathed in a closely woven suit and sent to school. One reason he feels

The rôle played by clothing in maintaining vigor

dumpish in school is because his body cannot breathe properly; his closely woven suit prevents the circulation of air, so that a layer of "dead" air is held against the skin. It would not be so serious if he were living out-of-doors in a strong wind, instead of in a schoolhouse where the air is quiet. Under the latter condition a person, young or old, cannot be anything but dull and inattentive. The chances are that he will frequently complain of headache or some other trouble, and the teacher will discipline him for lack of application to his studies.

A person should wear clothing which will permit the free ventilation of the body while at the same time preventing the too rapid loss of heat. Every one feels better in loosely woven clothes than he does in those through which the air can pass only very slowly. If any reader of these lines has a dull child in home or school, — one who out in the open is bright and responsive, — one thing to do is to examine his clothing. There may be many causes of his dullness, but one cause may be that he is encased in practically air-tight clothes, so that there is little opportunity for free circulation of air about his body.

Energy in relation to indoor temperature

Recently some investigations were undertaken on the heating of schoolrooms in a city in the Middle West. An accurate report was made on the temperature of a large number of rooms at different hours during the day. Records were kept of the temperature (1) on the floor, (2) at about the level of the pupils' heads when they were sitting, and (3) at the height of their heads when they were standing. The temperature at the height of the pupils' heads was uniformly higher than it was at their feet. In some cases there were 25 degrees difference. Suppose this condition should exist for several hours each day during the winter. It is practically certain that pupils would have hot heads and cold feet. And what would this lead to? Headache, congestion of the mucous membranes, mental cloudiness,

indisposition to work, and a general feeling of unrest and discomfort.

When a pupil is working hard with the brain and the temperature is high in the region of the head and low at the feet, nervous disturbance is apt to follow, and he is likely to get the "sniffles" or to have a "stuffed-up head." Some persons can resist better than others marked inequality in temperature between the head and the feet, but probably all persons are affected to some extent. Undoubtedly everyone could do better work with less strain and stress, and less discomfort afterward, if the temperature could be practically uniform at the foot and head levels. If there must be inequality it would be better to have the higher temperature at the feet when one is engaged in brain work. Mental activity tends to draw the blood to the head anyway. This is illustrated in psychological laboratories. A subject is placed on a balance so delicately adjusted that a slight increase in the weight of the head will cause the balance to tip headwards. At the outset the subject is at rest, engaged in no vigorous mental activity. Then he is given a difficult problem to solve. It can be observed that, if he works vigorously and continues long enough, the balance will often incline in the direction of the head.

Arranging a heating system so as to avoid inequality in temperature between head and floor levels

It is possible to arrange a heating system so that there will not be 20 or 25 degrees difference between the temperature at the floor and that at the head level. The reason there is such a difference in many schoolrooms is because the sources of heat are far removed from the windows and cold walls which radiate the heat quickly, and the air that is robbed of its heat drops on the floor. It is practically impossible to heat a classroom properly by hot air alone, unless there are several inlets to the room, and there is a strong forcing system

which keeps currents of hot air driving constantly against the windows and cold walls.

The best arrangement, however, is to have hot water or steam radiators under each window, and in addition to have warm air inlets with a fan system which will keep the air constantly in circulation. In this way very cold air cannot concentrate along the floor. Investigations have been made in schoolrooms in some of our coldest cities in which it has been shown that the difference in temperature between the floor and the head level is slight. It will probably be impossible on a cold day to have the temperature exactly the same at all levels in the room, but the difference will not be great in a properly heated room.

PART THREE

EXERCISES IN ANALYSIS, INTERPRETATION, INVESTIGATION, AND APPLICATION

I

MOTIVE FORCES IN DEVELOPMENT: PHYSICAL WELL-BEING

1. SECURE data bearing upon the statements made below, and if these are found to be accurate, suggest how they relate to the question pertaining to the connection between the development of the child and the evolution of the human race:

An examination of a child's features will show that only in a general way are they built upon the same pattern as those of his parents. His forehead is less prominent than theirs with relation to the face as a whole, while the chin is relatively more prominent. The nose is not so well defined, the features lack individuality, except possibly in respect to coloring; and even in this regard it is difficult to tell one infant from another. Where there are fifty infants in a maternity ward of a hospital they have to be tagged or otherwise marked in order that the mothers and nurses may be able to distinguish them.

2. Do you agree with the statements made in the following quotation from Preyer, *The Mind of the Child*, p. XIV?

"The mind of the new-born child, then, does not resemble a *tabula rasa*, upon which the senses first write their impressions, so that out of these the sum-total of our mental life arises through manifold reciprocal action, but the tablet is already written upon before birth, with many illegible, nay, unrecognizable and invisible marks, the traces of the imprint of countless sensuous impressions of long-gone generations."

3. Speaking for biology, Marshall says that the study of development "has revealed to us that each animal bears the mark

of its ancestry, and is compelled to discover its parentage in its own development; that the phases through which an animal passes in its progress from the egg to the adult are no accidental freaks, no mere matters of developmental convenience, but represent more or less closely, in more or less modified manner, the successive ancestral stages through which the present condition has been acquired. Evolution tells us that each animal has had a pedigree in the past. Embryology reveals to us this ancestry, because every animal in its own development repeats this history, climbs up its own genealogical tree."

Do we have any evidence showing that in his mental development the child "climbs up its own genealogical tree"? Cite data for and against this view.

4. Comment on the following from Lee, saying whether the statements made are in accord with your observations and experience; and if so, how the transitory character of particular games and plays can be accounted for:

"Everyone knows that a growing child passes through successive phases. The games that most delight him in the nursery are scornfully rejected during the succeeding period; the ring-around-a-rosy loses its magic power, the hobby-horse is bequeathed to a younger brother or turned out to pasture on the rubbish pile, the mud pie is stricken from the bill of fare. And as the eight-year-old scoffs at games of make-believe, so also the budding half-back despises tag and prisoner's base; while, on the other hand, the child of four feels no need of competition nor the subadolescent of team playing. There is a change not merely in games but in the child's whole attitude toward life." Lee, *Play in Education*, p. 62.

5. What are the bases of interest in a game like golf? Is it a child's, a youth's or an adult's game? Explain.

6. Why do people enjoy looking on at a game of baseball, football or the like? Is the interest in a bull fight, gladiatorial

contest, prize fight or broncho-busting round-up based on the same factors as interest in baseball, etc.? Explain the basis of interest in each of these activities.

7. Suggest evidence bearing upon McDougall's views as expressed in the following regarding the driving power of instinct:

"We may say, then, that directly or indirectly the instincts are the prime movers of all human activity; by the conative or impulse force of some instinct (or of some habit derived from an instinct), every train of thought, however cold and passionless it may seem, is borne along towards its end, and every bodily activity is initiated and sustained. The instinctive impulses determine the ends of all activities and supply the driving power by which all mental activities are sustained; and all the complex intellectual apparatus of the most highly developed mind is but a means toward these ends, and is but the instrument by which these impulses seek their satisfactions, while pleasure and pain do but serve to guide them in their choice of means.

"Take away these instinctive dispositions with their powerful impulses, and the organism would become incapable of activity of any kind; it would lie inert and motionless like a wonderful clockwork whose mainspring had been removed or a steam-engine whose fires had been drawn." McDougall, *Social Psychology*, eighth edition, p. 63.

8. Indicate what the following passage from Professor James means to you by citing concrete illustrations of the principles presented:

"Deep down in our own nature the biological foundations of our consciousness persist, undisguised and undiminished. Our sensations are here to attract us or to deter us, our memories to warn or encourage us, our feelings to impel, and our thoughts to restrain our behavior, so that on the whole we may prosper and our days be long in the land." James, *Talks to Teachers*, etc., p. 24.

9. Suggest evidence for or against the following statements regarding fear, together with the explanations offered to account for the prominence of fear at the age of three:

"The period of greatest fear, though it varies with special experiences, is usually at about three or four years of age. No matter how careful parents may be about having their children frightened by stories or otherwise, they usually become at this time virtually little ''fraid cats.' Biologically, this is the time

FIG. 68. — There are many persons who cannot live in any definite home; they are constantly wandering from place to place. (See exercise 10.)

when they begin to act for themselves to some extent away from parents, and consequently the time at which readiness to become frightened and run home would be most useful." Kirkpatrick, *Fundamentals of Child Study*, p. 102.

10. What impulses are responsible for the nomadic habits of gypsies? (Fig. 68.) Do all persons, especially the young, feel these impulses? What is the evidence?

11. Do children take "naturally" to the activity shown in Fig. 1, p. 14? Why? Should provision be made so that all children may engage in this activity?

II

MOTIVE FORCES IN DEVELOPMENT: SOCIAL, INTELLECTUAL AND ÆSTHETIC WELL-BEING

1. Are the following statements within the facts relating to the force of æsthetic feeling in animal and in human life? Give evidences in support or in denial of the statements:

"A human lover of bird songs can scarcely resist the impression that a songbird is exercising his æsthetic sense in making his melodies and that other birds must be affected æsthetically by them, while the artist has much the same feelings regarding the beauty of form and movement in bird and butterfly. Experiments, however, show that the selection of mates is not affected by changing the color of the wings of butterflies; hence it is not likely that the æsthetic sense is very prominent in these creatures and it is practically certain that it plays no part in the selection of mates and the development of certain types of coloring, as Darwin supposed it did. The same is probably true in the main of birds and mammals. The brilliant coloring that has been supposed to play an important part in the mating of animals is perhaps better explained as being due to the overflow of energy not used in reproduction, which modifies certain physiological processes and sensory-motor activities so as to produce bright colors with beauty of form and grace of movement.

"In man the æsthetic instinct has played an important part in mental development and in history. It is one of the most striking examples of an instinct developed beyond the necessities of physical survival and to an extent that makes it, in many

instances, stronger than the desire for food or the fear of danger." Kirkpatrick, *Genetic Psychology*, p. 104.

2. What does Wordsworth imply in his well-known phrase, — "The child is father of the man"? Does Milton express the same view when he says that "Childhood shows the man as morning shows the day"?

3. The pupils shown in the accompanying illustration (Fig. 69) look forward with great delight to the daily period devoted to

FIG. 69. — All children are very fond of throwing stones at human or other targets. (See exercise 3.)

throwing stones. What is the basis of this interest? Should provision be made for all young persons, boys as well as girls, to throw stones? Why?

4. The young tramps shown in Fig. 3, p. 29, are "bumming" their way across the country. What is the force which impels them to forsake home and friends and undergo the perils and hardships of this precarious life?

5. Figure 4, p. 31, shows the pupils in the Organic Education school at Fairhope, Alabama, dramatizing Indian life. What is the basis of children's interest in this kind of activity?

6. What motive forces sustain the children in the activities shown in Fig. 2, p. 25?

7. Account for the profound interest described in the following:

"In a summer resort where the writer was a visitor the past summer, day after day the whole male population of the hotel resorted to the fishing grounds. They paid two dollars and a half a day for a guide, seven dollars a day for a motor-boat, and a cent and a half each for worms. Surely a stranger uninitiated into our habits would have been amazed to see these returning fishermen at night indifferently handing over their catch to the guide. It was the fishing they desired, not the fish, and yet great was their woe when one large fish was lost in the act of landing. It is estimated by the New York *Times* that on Sundays and holidays when the weather is fine, twenty-five thousand people in New York City go fishing at a minimum cost of one dollar each, and of these no doubt more than ninety-five per cent go for fun and not for the fish." Patrick, *Psychology of Relaxation*, pp. 58–59.

8. Is there a difference between native *capacity* and *instinct*? If so, illustrate the difference between them by reference to an individual's performance in such fields as art or music or public speaking.

9. When a person is absorbed in a subject, as in the study of psychology or geometry, what are the sources of the motive force or drive which sustains him in his interest and effort?

10. Some writers hold to the view that all one's activities can be reduced to the reflex type, — sensory stimulus with motor response. Could you account for one's interest in and study of mental development, say, on this reflex principle?

11. Which makes the stronger appeal to boys from ten to seventeen or eighteen years of age, — football or baseball? Basket ball or marbles? Fishing or gambling with dice? Check-

ers or fox-and-geese? Account for differences in the appeal which these games or sports make.

12. Illustrate by concrete examples the statements made by Kirkpatrick in the following quotation:

"In man, with motor organs capable of an infinite variety of combinations, the constructive instinct has had a wonderful development, but not, as in the case of animals, toward any particular kind of structure characteristic of the species. The constructions of the spider, the bee, the robin, and the beaver are closely related to, and the natural outcome of, their structure and physiological processes. Man's motor mechanism, working in no fixed way but by varying combinations in a variety of ways, naturally fails to produce any one kind of structure rather than another, except perhaps that what he constructs is, like himself, usually bilaterally symmetrical. Each individual man has the general instinct, but must learn what to construct and how, while individual animals instinctively construct as those of their species have always done, with little or no learning from the example of their companions. In man, both the constructive and the collecting instinct take more or less playful forms and develop in many ways not demanded by the necessity for physical survival." Kirkpatrick, *Genetic Psychology*, p. 105.

13. In the following table, Colvin and Bagley list the principal instincts with the mode of expression of each and the emotion felt both when the instinct is adequately expressed and when its expression is blocked. Treat this list as follows: (*a*) Could the list be simplified without omitting any important instinct? (*b*) How early does each instinct begin to function and how long does it last? (*c*) Which instincts are useful in present-day life? Which, if any, are useless, and which are harmful? (*d*) Say whether the emotions accompanying the expression or the blocking of the instinct can be modified by direct treatment.

Name of Instinct	Physical Expression	Normal Feeling Accompanying Adequate Expression	Emotion Aroused by "Blocking" of Adequate Expression
Adaptive			
Imitation	Copying acts of others	Admiration	Vexation
Repetition	Repeating one's own movements		
Play	Spontaneous activity	Exhilaration	Hysterical ecstasy
Inquisitiveness	Prying, exploring, taking apart	Curiosity	Wonder
Constructiveness	Putting together	Pleasure of construction	Perplexity, elation
Migration	Seeking new surroundings	Novelty, "*Wanderlust*"	
Acquisitiveness	Collecting, hoarding	Desire	Greed, avarice
Individualistic			
(*a*) *Self-Protective*			
Combative	Fighting	Resentment	Anger, wrath, frenzy
Retractive			
(1) Shrinking	Hiding	Timidity	Terror
(2) Flight	Flight	Fear	Despair
Repulsive	Thrusting away	Dislike, dread	Disgust
(*b*) *Self-assertive*			
Self-assertion	Strutting, preening, domineering	Arrogance, superiority, pride, vanity	Shame, humiliation
(*c*) *Antisocial*			
Teasing and bullying	Torture, insult	Contempt	
Predatory	Stealing, destroying	Vindictiveness	Hate
Shyness	Withdrawal, seeking solitude	Self-distrust	Fright
Sex and Parental			
Sex	Mating	Conjugal love	Passion, sex jealousy
Protection of young	Guarding, shielding	Parental love	Self-renunciation, grief

Name of Instinct	Physical Expression	Normal Feeling Accompanying Adequate Expression	Emotion Aroused by "Blocking" of Adequate Expression
Social			
Rivalry	Competitive acts	Emulation	Jealousy, envy
Gregarious	Congregating in groups	Sociability, kinship	Homesickness, yearning for companionship
Coöperative	Working together	Loyalty	Remorse
Altruistic	Helping others	Friendliness, solicitude	Sympathy, pity, grief
Religious			
Self-abasement	Subjugation	Reverence, humility, veneration	Awe
Æsthetic			
Rhythmic	Dancing, song, chant	Harmony	Ecstasy
	Contemplation	Admiration	Rapture

III

PRIMITIVE MODES OF ADAPTIVE ACTIVITY; TRIAL AND SUCCESS; IMITATION

1. Does the ancient philosopher, Lucretius, give a correct picture in the following quotation of the helplessness of the infant as compared with the colt, the puppy and the young of other animals?

"An infant, as soon as nature, with great effort, has sent it forth from the womb of its mother into the regions of light, lies like a sailor cast out from the waves, in want of every kind of vital support; and fills the parts around with wailings, as is natural for one by whom so much evil in life remains to be undergone. But the various sorts of cattle, herds, and wild beasts, grow up with ease; they have no need of rattles or other toys; nor is the fond and broken voice of the nurse necessary to be used to one of them."

2. How long is a chick so helpless that it must be cared for by its parents? Speak in the same way of the puppy, the calf, the colt.

3. How long must the human child be cared for by its parents? Is there any significance attaching to the long period of immaturity in the human species?

4. Would it be an advantage or otherwise if the child came into the world ready to take care of himself in most respects? Explain.

5. Compare the length of the period of immaturity of the young in different races with the relative position in the scale of

civilization occupied by these races. Explain the facts as you find them.

6. Is it a benefit or is it a hindrance to a boy to be thrown wholly on his own resources by the time he reaches the age of sixteen? Is it different with a girl? What principle is involved?

7. Is there a tendency for boys and girls in America to indulge in adult practices too early? If you think so, mention some adult activities in which the young participate too early, and give the principles of development upon which your answer is based.

8. What does it signify for an individual, boy or girl, to become *blasé* in the teens? What experiences tend to make boys and girls *blasé?* Is it helpful or harmful for a boy or girl to become "sophisticated" early? Why?

9. Comment on the following:

A boy does not learn to smoke because he enjoys it at the start, but because he sees his fellows doing it. Naturally, if his set is made up of adults, then he will want to imitate them. But not once in a thousand cases will a boy feel that he ought to be a member of a group of grown men, having the same privileges and responsibilities that they do. What we must do, then, is to get the sentiment established in every boy group that smoking is taboo.

10. Suppose we could arrange a child's environment and plan his education so as to hasten his development and bring him to maturity several years before the usual age; would that be desirable? Explain your answer.

11. Are the facts in the following paragraph true? If so, state the principles involved:

I have often attempted to induce very young children to attend to verbal forms which I would write on a blackboard or on a piece of paper, and which older children would "study" with much success. But while a three-year-old child would follow me

while I was making these forms, he could not attend successfully to the forms themselves. Such a child can probably catch a general impression, as of a white something on a dark background, or *vice versa;* but he cannot grasp the characteristics of the words as individual things. His attention is not sufficiently specialized or differentiated for this. It is the same with spoken language. The infant long responds to the quality of a voice — the timbre and intonation — before he can attend to articulate language. Again, the principle holds in an activity like writing. The child of three has good control of his hand in the execution of an elaborate repertoire of manual activities, but one cannot teach him at this age to write words with any success. He cannot perform the specialized processes required for this task.

12. Why does an Irishman, or other foreigner, who comes to this country after he is mature always retain a brogue? Do you think such a person actually *hears* our words exactly as we do? Why? Why does a German who has learned to write English script after he has become mature always show traces of the German script in his English forms?

13. When one hears a foreign language spoken for the first time the words seem to run together, and the speaker appears to speak much more rapidly than he actually does speak. Explain.

14. Can you pitch a curved ball? Have you ever watched an expert do it? Did you see every detail of his movements in pitching the ball? What did you see? Explain.

15. Why is it so unusual for a novice to follow exactly his gymnastic teacher in the execution of simple exercises? Why does the teacher keep showing the same act over and over again?

16. Why cannot a child, who has a very wide range of vocal power, run a scale the first time he tries in imitation of his teacher?

17. Are children more or are they less imitative than adults?

Why? Are children of five more or are they less imitative than children of ten? of fifteen?

18. Observe the children about you with respect to their imitative activities, and make a list of the persons and actions most commonly and persistently imitated at different ages from five onward. Explain.

19. Why does a child of five not imitate all that is going on about him? Discuss the same question with reference to adults in different vocations and different social environments.

20. Does imitation assist the individual in adapting himself to the world? Is it ever a handicap to him?

21. Are some children more imitative than other children of the same age? If so, why? Which individual has the advantage, — the one who imitates very freely or the one who imitates less freely? Why?

22. Why is it that quite young children usually try to imitate their parents in all they do, while children in the teens often make a conscious effort to avoid doing what they see their parents do?

23. Explain the following:

I have tried the experiment of drawing three lines each three inches long before a class of young pupils. Then erasing the lines, I asked the pupils to go to the board and do exactly what I did. They drew lines from one to eight inches long, and some of the pupils drew as many as six lines. None of them apparently tried to do precisely what I did.

24. Explain the following:

When I began school I persisted in writing and drawing my copies and pictures upside down. I was told to draw some evergreen trees with branches pointing downward. The teacher set a copy. I tried my best, but the branches of my trees pointed upward. These were the kind I had been in the habit of seeing and drawing in my own crude way. I made no progress in my

drawing until my teacher suggested that I draw them upside down, which I did with greater success.

25. In the case of a pupil mispronouncing a word, do the correct and the incorrect pronunciations sound the same to him? Explain.

26. Why does a novice make so many grimaces when attempting to reproduce a scale sung by his teacher?

27. What is the significance of the fact that a pupil will study a geometrical figure for a considerable period and then when he is asked to reproduce the figure he may say: "I can see it in my mind's eye, but I cannot draw it"?

28. If a person had no occasion to learn to draw or write until he was mature, would he go through the same stages in learning to write as a child does? Explain.

29. Why is it that when a number of pupils reproduce writing or drawing from the same copy, the results are all different?

30. Apply the principle in the following quotation to the teaching of writing, drawing, playing tennis, etc.

"It is a familiar fact that a bicycle rider avoids the ditch best by keeping his attention on the path. The nervous energy is automatically withdrawn from the channels leading to the muscles not concerned when the nervous channels to the appropriate muscles become more open. Directions should be positive, then, rather than negative. The pupil should be shown what to do rather than what not to do. The only exception to this rule appears when the pupil has fallen into bad habits which need to be broken up. Then it may be necessary to call attention to the thing to be avoided." Freeman, *The Teaching of Handwriting*, p. 26.

31. What is the value for adaptation of the type of activity described by Colvin and Bagley in the following:

"The individual instinctively copies again and again his own

movements. This sort of imitation has been termed 'circular activity.' It is well illustrated by the young child in his acquisition of spoken language. He repeats over and over again some sound that he at first utters quite spontaneously. This explains the seemingly meaningless ma-ma-mas, pa-pa-pas, da-da-das, and other similar babblings of the infant in the second half year of his life." Colvin and Bagley, *Human Behavior*, p. 30.

32. Are the statements in the following quotation true? If so, explain them in view of principles of development that have been or should have been considered.

"It is well known that a child who can laugh or cry perfectly in response to the proper stimulations may be unable to do so voluntarily. The same truth applies to a greater or less extent to everything that the child does. He may, under proper conditions, walk or stand gracefully, but not be able to do so voluntarily." Kirkpatrick, *Genetic Psychology*, p. 309.

33. Does Wordsworth indulge in poetic license or does he keep well within the facts in the following stanza from *Intimations of Immortality:*

"Behold the Child among his new-born blisses,
A six years' Darling of a pygmy size!
See, where 'mid work of his own hand he lies,
Fretted by sallies of his mother's kisses,
With light upon him from his father's eyes!
See, at his feet, some little plan or chart,
Some fragment from his dream of human life,
Shaped by himself with newly-learnèd art;
A wedding or a festival,
A mourning or a funeral;
And this hath now his heart,
And unto this he frames his song;
Then will he fit his tongue
To dialogues of business, love, or strife;
But it will not be long

Ere this be thrown aside
And with new joy and pride
The little Actor cons another part;
Filling from time to time his 'humorous stage'
With all the Persons, down to palsied Age,
That Life brings with her in her equipage;
As if his whole vocation
Were endless imitation."

34. What type of intelligence is revealed in the following experiments upon a crayfish?

"A simple labyrinth was constructed consisting of a box having a small compartment at one end, and an opening at the other leading to an aquarium. From the open end a median partition extended back a short distance, and one of the passages so formed was closed with a glass plate. The crayfish liberated from the small compartment was provided with a choice of two paths only one of which would lead it to the water; and the endeavor was made to ascertain if the crayfish, after a number of trials, would unerringly choose the right path. The crayfish used were put through a number of preliminary experiments with both passages open to determine if they had any tendency to go toward the right or the left, and after it was shown that either path was chosen with equal readiness, the glass plate was inserted and the animals put again into the box. In the first experiment the crayfish took the correct path in 50 per cent of the trials, and during the subsequent trials the percentage of correct choices gradually rose until in the final ten trials it reached 90 per cent. The improvement was very gradual, as is indicated by the following series of percentages of successful trials for each set of ten trips: 50, 60, 75.8, 83.3, 76.6, 90. Although slowly acquired, the habit of following the right path was not forgotten after an interval of two weeks." Holmes, *The Evolution of Animal Intelligence*, pp. 184–185.

35. Comment on the intelligence of ants as indicated in the following experiment reported by Sir John Lubbock:

"In order to test their intelligence, it has always seemed to me that there was no better way than to ascertain some object that they would clearly desire, and then to interpose some obstacle which a little ingenuity would enable them to overcome. Following up, then, the preceding observations, I placed some larvæ in a cup which I put on a slip of glass surrounded by water, but accessible to the ants by one pathway in which was a bridge consisting of a strip of paper $\frac{2}{3}$ inch long and 1 inch wide. Having then put a *Lasius niger* from one of my nests to these larvæ, she began carrying them off, and by degrees a number of friends came to help her. I then, when about twenty-five ants were so engaged, moved the little paper bridge slightly, so as to leave a chasm, just so wide that the ants could not reach across. They came and tried hard to do so; but it did not occur to them to push the paper bridge, though the distance was only about 1 inch, and they might easily have done so. After trying for about a quarter of an hour, they gave up the attempt and returned home. This I repeated several times." Holmes, *op. cit.*, pp. 211–212.

36. In the following statements is too much claimed for imitation as a form of adaptive activity?

"The child's method of study is by impersonation, by putting himself inside the thing he wants to know, being it, and seeing how it feels. What he is doing when he acts mother, horse, engine, blacksmith, bear, is finding out by actual experience what these most interesting playmates really are. He learns the main characters in the drama in which he has been cast by assuming each in turn. Whatever personality interests him into that he transmigrates and shares the exhilaration of its deeds. Later he will study practicalities, will criticize, perceive methods and limitations. Now his instinct is to grasp the whole, to enter by

one sheer leap of intuition into the heart of the object of his study and act out from that." Lee, *Play in Education*, p. 109.

37. Lee in speaking of rhythm maintains that it plays a large part in the learning of any act. Does he overstate the case in the quotation given below? Are his statements in accord with the principles developed in the text?

"It (rhythm) is at the basis of every form of skill. You cannot be a good carpenter, blacksmith, pianist, you cannot row or paddle or play golf, until you have formed an accurate image in your mind of the time length and sequence of those motions of which the special skill consists. To learn how to do a thing is to train the mind and muscles not merely to the form of the required movement, but to its swing and ictus. The skillful violinist foresees his stroke in its exact emphasis. The good batsman accents his swing at the ball with an extraordinary nicety before he makes it. Rightly to perform any physical act you must, as we say, first get the hang of it." Lee, *op. cit.*, p. 157.

38. Are the principles by Woodworth presented below in accord with the principles concerning imitation developed in the text?

"There exists in the child at a certain early age, and in some degree later as well, a tendency to imitate a drive, easily aroused towards performing acts like those perceived in other persons, especially in persons that possess for the child a degree of prestige. The imitating child, or youth or adult, is not a purely passive mechanism, but contains a drive towards imitation that can readily be aroused to activity. The child *likes* to imitate, this liking being part of his general social orientation." Woodworth, *Dynamic Psychology*, pp. 186–187.

39. Do young persons take "naturally" to the kind of activities illustrated in Fig. 5, p. 46? Explain. What are the effects upon the individual of engaging in such activities?

IV

HIGHER FORMS OF ADAPTIVE ACTIVITY: GENERALIZATION, SYMBOLIZATION, IMAGINATION, REASON

1. Do primitive people rely entirely upon the trial-and-error method in adapting themselves to their environments? Cite evidence showing whether or not the Indians, for instance, employed their experience conceptually to improve their situation.

2. Is the term "Free Ideas," as used by Colvin and Bagley in the following quotation, an appropriate one? Give detailed reasons for your answer. Does any animal have such ideas as are described in the quotation?

"The highest form of learning is found in *consciously* bringing the past experience to bear on the present. The individual learns how to conduct himself in a given situation. Later a new situation is presented that has elements similar to the previous situation, and knowingly he uses the experience gained in the former situation to aid him in solving the new. He has taken certain 'ideas of procedure' gained through one experience and intelligently applied these to the novel conditions in so far as they will fit. When we say that he has an 'idea of procedure,' we mean that he consciously 'knows how' certain things are done. He does not need to begin entirely anew; what he has before done comes to his aid, although the situation is not the same. This ability to apply consciously elements of a past experience that differs in essential details from the earlier one has been termed by psychologists the power of forming 'free ideas.' The term 'free' indicates that the idea in question has been detached

from the situation in which it first arose and can be used under other conditions." Colvin and Bagley, *Human Behavior*, p. 31.

3. What is the relation of the following to the view of adaptive activities presented in the text?

"When the same or similar conditions in the environment are repeatedly presented to the organism so that it is called upon to react in a similar or almost identical way each time, there tends to be organized a mechanism of reaction which becomes more and more automatic and is accompanied by a state of mind of less and less awareness. . . . Clear consciousness does not accompany reaction to stimuli when the issue in conduct can only occur in a single direction, when there are no alternatives. Consciousness is an expression, as it were, of conflict. It arises in response to stimuli under conditions that make it possible to react by a choice of a line of conduct in any one of many directions." White, *Mechanism of Character Formation*, pp. 30–31.

4. How does one gain "wisdom" in any field? Is "sagacity" inborn or is it acquired? How does a sagacious or a wise person respond to a situation differently from a mediocre person? Illustrate by concrete instances, and explain.

5. William James, in his *Psychology, Briefer Course*, p. 328, says that as one grows older he loses the power to respond to new experience in new ways. "Most of us grow more and more enslaved to the stock conceptions with which we have become familiar and less and less capable of assimilating impressions in any but the old ways." Discuss this view from the standpoint of conceptual adaptation. Why should one not become ever more independent of the "old ways" as his experiences increase?

6. Is the following, reported by Professor Lloyd Morgan concerning the ingenuity of his dog Toby in opening a gate, typical of the ingenuity of all dogs?

"The gate was fastened by a latch, but swung open by itself if the latch was raised. Whenever the dog desired to make his escape he put his head between the bars, lifted the latch and went out. Such an act might of course have been the result of the dog's studying the hinges, latch, and general make-up of the gate, and concluding that if the latch were raised the gate would be free to swing open. Such a course would be a very natural one for a human being, but few would consider that a dog would be likely to follow it. The dog might, however, learn to open the gate by watching someone do it and then imitating him. In this case the dog might be thought to conclude that 'since a man lifted the latch and went out, therefore, I can lift the latch and go out.' As a matter of fact the dog learned to make his escape in neither of these ways. His method of learning the trick, which was watched from the beginning, was as follows: Being placed in the yard from which he was anxious to escape, Toby poked his head between the bars of the fence in various places and by chance placed it under the latch and raised it, when the gate swung open and he scampered out on the street."

7. Is an animal capable of dissociating the elements of experience and recombining them in novel patterns in the manner described by Miller in the following?

"The stream of images which is constantly flowing in the thinking process moves in accordance with the laws of association. But it has been one of the functions of imagination to free the elements of past experience which are brought before the mind from much of their original setting, or context, and to make of them movable elements which shall be free to enter into new associative combinations. Thus, one's image *tree* need not necessarily carry with it the thought of the particular place where the tree grew, the fact that it was in blossom, or that there was a swing under the tree, although all of these may have been parts of one original perceptual whole. Not only can the image

tree be taken out of this setting and given a new context, but even the order and arrangement of its own parts can be changed at will." Miller, *The Psychology of Thinking*, pp. 134–135.

8. How would you explain the action of the "small dog" reported by Romanes in the following incident in which a large and a small dog are involved?

"One of them, the larger, had a bone, and when he had left it the smaller dog went to take it, the larger one growled, and the other retired to a corner. Shortly afterward the larger dog went out, but the other did not appear to notice this, and at any rate did not move. A few minutes later the large dog was heard to bark out-of-doors; the little dog then, without a moment's hesitation, went straight to the bone and took it. It thus appears evident that she reasoned — 'That dog is barking out-of-doors, therefore he is not in this room, therefore it is safe for me to take the bone.' The action was so rapid as to be clearly a consequence of the other dog's barking." Holmes, *The Evolution of Animal Intelligence*, p. 250.

9. Give at least one instance of apparent reasoning on the part of an animal. Give all the circumstances — every detail of the entire performance — and show that it was or was not a case of genuine reasoning.

10. Regarding the facts of human nature as you know them, would you agree with Woodworth that the ordinary man is a creature of habit with but little originality? Woodworth's views are given below:

"The ordinary man, followed through his day's routine, reveals little originality. Surrounded for the most part by familiar objects, he perceives them in the old ways or neglects them as he is wont. He meets the regular demands made on him by the regular acts that he has learned to make. Even if the objects that confront him are somewhat novel, he assimilates them to familiar types of objects, and makes little response to their

novelty; and even if the conditions he has to meet are somewhat new, he comes through, as best he may, with his old stock of reactions. The inertia of habit carries him along; and as he has become pretty well adapted to his circumstances, habit carries him along pretty smoothly. Yet some embers of originality are still smoldering within him and can be fanned into life, when conditions are right. If we ask what are the conditions favorable to arousing the factor of originality, we find long-accepted answer in the maxim 'Necessity is the mother of invention.' 'Invention,' broadly interpreted, covers all forms of original behavior. The idea is that routine is the line of least resistance, departed from only under the spur of necessity. Necessity, to revert to our favorite mode of expression, furnishes the drive for original activity." Woodworth, *Dynamic Psychology*, pp. 136–137.

11. Analyze the more important subjects taught in the elementary school, and indicate what type of response to situations, (sensori-motor, sensori-central-motor, central-motor), is predominantly required for the mastery of each subject. Does the type of response change from the initial steps to complete mastery of any subject?

12. What did the apostle mean when he said:

"When I was a child I spake as a child, I understood as a child, I thought as a child; but when I became a man I put away childish things."

13. On p. 65 are given illustrations showing views of the brain of animals and of man. (Fig. 6.) What inferences may be drawn therefrom with respect to the range and complexity of higher forms of adaptive activity in man as compared with animals?

14. Is the distinction made below between the scientific and the unscientific method in dealing with a situation valid? If so, show why this distinction should exist.

"Like the lower animals, man is prone to accept appearances as true to fact. In other words, he continues to use the animal method. To be sure, scientists, as we have said, have a method. They prepare an experiment so as to control conditions, and they eliminate one factor after another that the effect of each in the phenomenon under investigation may be determined. This is man's reconstruction of nature's trial-and-error method, but it is too slow and laborious to satisfy the unscientific. These people want immediate results. So they draw conclusions from limited and uncontrolled observations, and take much pride in what 'experience' has taught them." Swift, *Psychology and the Day's Work*, p. 18.

15. Why is a scientific person so much more "cautious" than an unscientific person? What does "cautious" as used here mean?

16. At what age does an individual begin to be interested in science and scientific method? Why not earlier?

17. We frequently hear men say that "Man is a *thinking* animal." What do they mean by this phrase?

18. The quotation below is taken from Lees. What is the value for adaptation of the ability to foresee the outcome of a given line of action? Did Napoleon's genius depend mainly upon this ability? At what age does this ability begin to appear? Napoleon is quoted by Lees as saying:

"If I appear to be always ready to reply to everything, it is because, before undertaking anything, I have meditated for a long time — I have foreseen what might happen. It is not a spirit which suddenly reveals to me what I have to say or do in a circumstance unexpected by others — it is reflection, meditation." Quoted from Lees by Swift, *Psychology and the Day's Work*, p. 53.

19. Rephrase the following quotation, and illustrate the principles with two or three concrete instances in which the

essential characteristics and function of reasoning will be apparent.

"The great problem of living creatures in their evolution from lower to higher forms is that of control over their environment. That form of control is most valuable in which the individual is able to manipulate elements of his environment in such a way as to make them serve as means to the realization of his own ends. The conscious processes are significant in the life of the organism on this very account. Reasoning is the culmination and summation of all the conscious processes in so far as they may be conceived as control phenomena. All thinking essentially is constructive in its nature. As it approaches that stage of development and organization which we call reasoning, it enables the individual to deal more and more effectively with new situations, thus enlarging and expanding his field of control over the world in which he lives." Miller, *op. cit.*, pp. 291–292.

20. Restate in your own phrasing the principles presented by Miller in the quotation given below. Then illustrate the principles with instances drawn from your daily experience.

"The logical concept is the result of reflective reconstruction of vaguer concepts. The scientist goes over his experiences with nut trees and also supplements them with further specific and careful observations. On the basis of this more reflective study he constructs his concepts of chestnut tree, walnut tree, etc. In these cases the concepts are so definite and so carefully limited in the mind of the person who has them that he can give definitions. But ask the average boy what a chestnut tree is, and he will tell you simply that it is a tree that bears chestnuts. And ask him how he knows that a certain tree is a chestnut tree, and he will probably tell you that he has always known it, or that everybody knows that it is a chestnut tree. But the scientist knows exactly the meaning which is involved in the use of the term; for it has been carefully

and reflectively worked out by specially directed observation and study with a view of determining the essential characteristics of the thing.

"The same general principle holds true of that class of concepts which we more commonly call laws and principles. The child may in a vague way know something of the law of development of plants. But he has never worked out that law reflectively

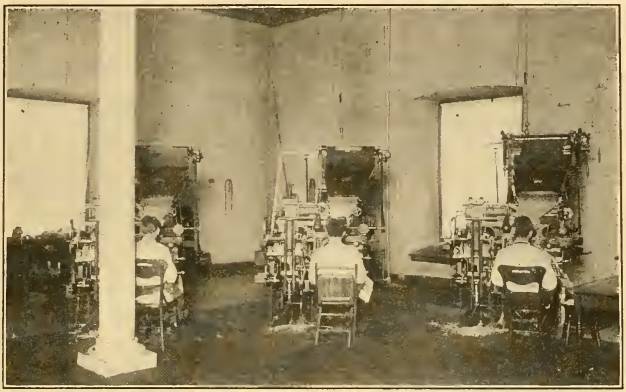

FIG. 70. — The operation of a linotype machine requires a high degree of technical intelligence. (See exercise 21.)

and might have great difficulty in formulating it in any satisfactory terms. But the trained botanist, having gone over the whole ground very carefully with the explicit intention of finding the exact law, would have a clear and definite idea of it which he could formulate in exact terms.

"Whether we are dealing with class concepts or general notions in the form of laws and principles, it is these reflective notions which we call logical concepts. *The logical concept may be defined as one which has arisen as the result of reflective reconstruction,*

and one in which the elements of meaning have, consequently, been brought fully and explicitly to consciousness and have been formulated in the mind." Miller, *op. cit.*, pp. 207–208.

21. Do you think that by any kind or degree of education an animal could be trained to operate a linotype machine? (Fig. 70.) Explain.

V

EXPRESSIONAL ACTIVITIES: VOCAL, FEATURAL, POSTURAL, GESTURAL

1. CAN one tell from the color of the cheeks what type of emotion an individual is experiencing? Does age make a difference? Explain.

2. What is the difference between *physiognomy* and *expression?* Show the difference between determining one's emotions from the *expression* of the eye, for instance, and determining them from the *physiognominal characteristics* of the eye. Has physiognomy any scientific basis?

3. Do young children who are exceptionally bright gesticulate more or do they gesticulate less in expressing themselves than do children of the same age who are backward? How is it with persons in the teens? With persons in the college age? Explain the facts as you find them.

4. Do girls of any age use gesture more freely than boys of the same age, or is it the other way around? Explain the facts as you find them.

5. Mention the emotional attitudes, if any, that will always be revealed in the intonations of a boy in the teens. Will these attitudes be revealed also in the intonations of a girl in the teens? Is a girl's voice more responsive to emotional experience than a boy's? Explain.

6. Is the free use of gesture of service to pupils in the elementary school in the expression of their thought? Is it of service in the high school? Is it a hindrance in either place? Explain the facts as you find them.

7. Why do young persons, both in the elementary and in

the high school, employ featural, postural and gestural expression more freely on the playground than they do in their recitations? Why is there such a contrast in these respects between the activities of the playground and the activities of the schoolroom?

8. Does the study of elocution assist a pupil to employ featural, gestural and postural expression freely in his everyday needs? Was the olden-time practice of "speaking pieces" on Friday afternoons of value?

9. Does Mosher overstate the prevalence and the value of gesture in public speaking in the following quotation?

"The person who speaks in public should make gestures; he misses a great advantage if he doesn't, but they must do more than serve as a mere outlet for nervous energy, more than furnish the stimulation which usually results from their reaction. They must speak distinctly to the audience; they must help to illuminate, vitalize, and enforce his verbal expression. This they can do, for gestures are not only constantly in evidence in our everyday life, but they are as organic a part of our inter-communication as is speech. One has but to watch the participants in the next few conversations he observes, or the next dramatic performance he attends, to be impressed with the truth of this statement. We are continually emphasizing, locating, describing, or displaying a mental or emotional state by means of gesture." Mosher, *The Essentials of Effective Gesture*, p. 2.

10. Do the most effective public speakers freely employ featural, postural and gestural expression? Describe instances of figurative expression actually employed by a public speaker, and say whether the expression was an aid or a hindrance in conveying his thought to his audience.

11. Give instances of figurative, gestural and postural expression generally employed by boys in the teens. Do girls use the same expression? Is this expression of service alike to the performer and to the observers?

FIG. 71. — These children have been unable to keep abreast of their classmates in school work, and they are engaged mainly in concrete, manual activities. (See exercise 16.)

12. Does Mantegazza go beyond the facts in referring to the universality of physical expression in the following quotation? What precisely is the difference between conventional and physical expression, as Mantegazza uses these terms?

Fig. 72. — A study in expression. (See exercise 17.)

"Like language, physical expression presents many varieties of form; but it is always a more universal language. Words, whatever may be their origin, have always a conventional meaning; thus they are only of value to one who comprehends them and follows their meaning. Spontaneous physical expression, on the other hand, is the language of all intelligent men, and extends its influence beyond the domain of humanity; it is comprehensible to those animals who most approximate to us by the development of their nerve centers. Say to a dog, to a child who does not yet know how to speak, or to a foreigner who does not know our language, the word *brigand*, at the same time smiling benevolently or making affectionate gestures; these

three beings, very different in their natures, but all equally ignorant of the sense of the word *brigand*, will reply to you with an expression of affection. Say to them, on the contrary, the word *dearest* with an expression of hatred or a threatening gesture. You will see them shrink with terror, attempt to escape or utter complaints. This very simple example is enough to indicate the boundary which separates conventional language

FIG. 73. — A study in expression. (See exercise 17.)

from the simple and elementary language of physical expression." *Physiognomy and Expression*, p. 80.

13. Endeavor, first, to find a good photographic illustration and then attempt a clear verbal description of each type of countenance mentioned below:

The melancholy countenance	The misanthropic countenance
The pessimistic countenance	The giddy countenance
The optimistic countenance	The sociable countenance
The debased countenance	The imperious countenance

The audacious countenance
The suspicious countenance
The defiant countenance
The modest countenance
The ascetic countenance
The chaste countenance
The hypocritical countenance
The frank countenance
The avaricious countenance
The despairing countenance
The benevolent countenance
The ferocious countenance
The cruel countenance
The meditative countenance
The inspired countenance
The ecstatic countenance
The frightened countenance
The pugnacious countenance
The contemptuous countenance
The ironical countenance
The inquisitorial countenance

14. The phrenological chart shown on p. 80 (Fig. 7) has been and still is extensively employed by persons who profess to be able to "read one's character" by means of it. Point out the difference between determining a person's traits from his expression and trying to determine it from a phrenological chart. Is there any scientific basis for phrenology?

15. Palmistry or chiromancy has been and still is extensively practiced in "reading one's character." The chart shown on p. 82 (Fig. 8) shows the meaning that is supposed to be revealed by the various mounts and lines of the hand. Is there any scientific basis for palmistry? Point out the difference between determining one's emotions from the expression of the hand and trying to determine them by the method of palmistry.

16. What intellectual and emotional traits are revealed in each countenance in the picture on p. 321? (Fig. 71.)

17. What emotional and intellectual attitudes are revealed in the photographs on pp. 322 and 323? (Figs. 72 and 73.)

18. What intellectual and emotional traits or activities are revealed by the expression of (*a*) each of the five brows shown in Fig. 9, p. 85; (*b*) each of the seven pairs of lips shown in Fig. 10, p. 87; (*c*) each of the nine pairs of eyes shown in Fig. 11, p. 94? Give reasons for your answer in each case.

VI

EXPRESSIONAL ACTIVITIES: GRAPHIC, PICTORIAL

1. WHAT principle relating to the development of conventional language is illustrated in the evolution of the letter *M* as shown in Fig. 12, p. 108?

2. Compare the typical examples of pictorial writing given in Figs. 13 and 13 *a*, pp. 109 and 110, with symbols which children would spontaneously draw to express the same ideas.

3. On p. 112 is reproduced from Barnes a drawing made by a pupil to tell the story of "Jack and the Bean Stalk." (Fig. 14.) What was the age of the pupil? Is the drawing as a whole and in detail a faithful portrayal probably of the intellectual processes of a pupil of this age?

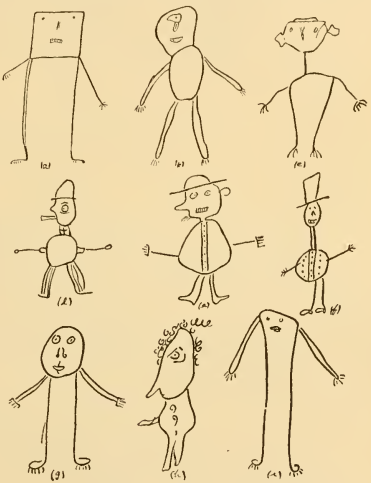

FIG. 74. — Children's spontaneous drawings grouped according to themes. (See exercise 4.)

4. Herewith are shown typical examples of children's spontaneous drawings (Figs. 74, 75, 76) grouped according to themes. Treat them as follows: (*a*) say at what age each figure or story was

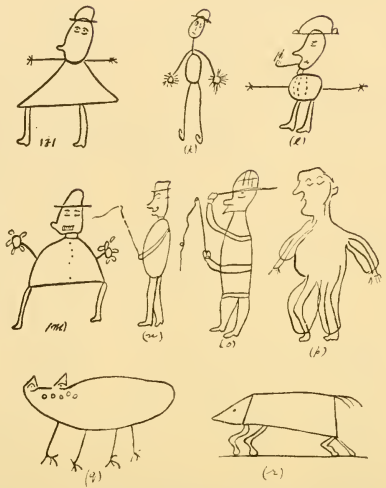

FIG. 75. — Children's spontaneous drawings grouped according to themes. (See exercise 4.)

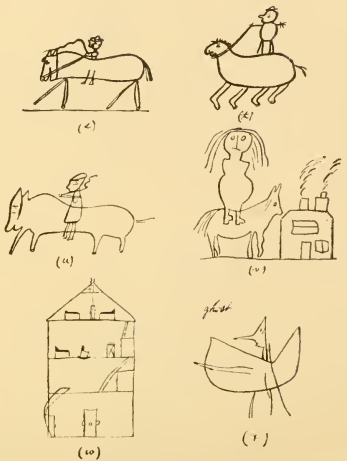

FIG. 76. — Children's spontaneous drawings grouped according to themes. (See exercise 4.)

probably drawn; (*b*) say whether the drawing is symbolic or representative or both; (*c*) account for the distinguishing characteristic of each figure or story; (*d*) say whether in your opinion each drawing is a faithful portrayal of what was in the artist's mind at the time of execution.

5. Professor Barnes read the story of "Johnny-Look-in-the-Air" to pupils from six to sixteen years of age, and they were asked to tell the story in pictures. The story is as follows:

"As he trudged along to school,
It was always Johnny's rule
To be looking at the sky
And the clouds that floated by;
But just what before him lay,
In his way,
Johnny never thought about;
So that everyone cried out: —
'Look at little Johnny there,
Little Johnny-Look-in-the-Air.'

"Running just in Johnny's way,
Came a little Dog one day;
Johnny's eyes were still astray
Up on high, in the sky;
And he never heard them cry: —
'Johnny, mind, the dog is nigh!'
What happens now? —
Down they fell with such a thump,
Dog and Johnny in a lump!
They almost broke their bones,
So hard they tumbled on the stones.

"Once with head as high as ever,
Johnny walked beside the river,
Johnny watched the swallows trying
Which was cleverest at flying. . . .

Johnny watched the bright, round sun
Going in and coming out —
This was all he thought about.
So he strode on — only think! —
To the river's very brink,
Where the bank was high and steep,
And the water very deep;
And the fishes, in a row,
Stared to see him coming so.

"One step more! Lo, sad to tell!
Headlong in poor Johnny fell.
The three little fishes, in dismay,
Wagged their heads and swam away.
There lay Johnny on his face
With his nice red writing-case;
But, as they were passing by,
Two strong men had heard him cry;
And, with sticks, these two strong men
Hooked poor Johnny out again.
Oh! you should have seen him shiver
When they pull'd him from the river.
He was in a sorry plight,
Dripping wet, and such a fright!"

In illustrating the story, one pupil drew six separate scenes, while two others made but one scene each. What was the age of the pupil who made each drawing? Suggest explanations of the differences in the illustrations of the three pupils. Comment on the value of the drawings as indicating the events in the story which impressed each pupil, and the logical character of the mental processes of each. (Figs. 15, p. 119; 15*a*, p. 120; 15*b*, p. 121; 16, p. 124, and 17, p. 124.)

6. Do the young naturally acquire an interest in making beautiful pictures and drawings? If so, at what age? Do they naturally like to make mechanical drawings? If so, at what age?

VII

THE DEVELOPMENT OF COÖRDINATION

1. JUST what is the distinction between muscular power and motor coördination? Illustrate the distinction with reference to the arm, hand and fingers, for instance.

2. What is the effect upon a child's motor expressions of requiring him to perform any task demanding intricate and precise coördination? Observe his facial and general bodily attitudes and movements when he is making the attempt and note what occurs. What is the explanation?

3. Are forward children in school more or are they less "clumsy" than backward ones? Can the bright pupils do better work in writing, drawing and the like? Can they wrestle better? run faster? jump higher? shout louder?

4. Compare bright and backward pupils with respect to their advancement in articulation, say in reading. Can you detect a difference? If so, in whose favor? What principle of development is involved?

5. Observe children, from six years onward, in their spontaneous motor activities. Do the younger children generally choose occupations requiring precision and elaborate coördination of the accessory muscles, or those involving mainly the fundamental muscles in a comparatively incoördinated and coarse way? Do older children indulge in activities requiring precision in control of muscles, especially the fingers? Comment on the facts as you find them.

6. What mutilations occur in the words spoken by a drunken

man, such words as "horse," "yes," "pudding," "Ypsilanti," *et al.?* Explain the phenomena as you find them.

7. What is the effect of fatigue on such processes as fine writing, threading a needle, and the like? Explain.

8. What influence does fear exert on motor coördination? Why? Does great joy exert the same influence?

9. Does strong coffee have any influence on precise coördination? Does tobacco?

10. A child of three is given a picture of an apple to cut out. He grasps the scissors firmly and slashes away, not being able to cut along the line indicated. His body is tense and his mouth works in unison with the scissors. Discuss the principle involved.

11. Apply the principles in the following quotation to the teaching of writing, drawing, etc.:

"The adult often does not realize that a movement which for him is rough and careless is for the child precise and careful. It is easy for the adult to realize the strain of attention and fatigue due to making adjustments which are to him very precise, such as would be involved in making a fine mechanical drawing, adjusting the parts of a watch, or doing intricate embroidery. Yet the expert in these fields can work all day without undue fatigue. The feat of ordinary writing which an adult can carry on for hours is to the young child a task fatiguing both because of its newness, and because the degree of precision which is required is high in relation to his ability." Freeman, *The Teaching of Handwriting*, p. 51.

12. What does each statement given below mean to you? Do the facts of development, so far as you know them, justify each proposition presented?

"The development of the child is crudely and imperfectly parallel to the evolution of the human species. Hence the essential vital organs are the first to become efficient. Their growth and development are aided by the exercise of the heavy

muscles of trunk, legs, and arms. The exercise of these muscles stimulates also the growth and development of the fundamental nervous centers in the brain. This fortifies the nervous system against all forms of nervous weakness and collapse. Nervous prostration must be prevented by physical exercise in the kindergarten and lower grades. Here the foundations of power must be laid deep and strong. At this age strength is more important than grace or beauty." Tyler, *Growth and Education*, p. 46.

13. Viewing the matter from the standpoint of the development of coördination, which types of work shown in the three illustrations (Figs. 18, p. 131; 19, p. 132, and 20, p. 134) can be commended? Which, if any, should be condemned?

14. Considering the ages of the children in the picture on p. 138 (Fig. 21), is too great a demand made upon coördination by any of their activities? Explain.

VIII

THE DEVELOPMENT OF INHIBITION: THE NEUROLOGICAL AND PSYCHOLOGICAL VIEW

1. The following quotation is from the biologist, Professor Jennings, of Johns Hopkins. Suggest educational applications of the principle contained in the quotation:

"Training is even harmful when it comes earlier than the development of the power which it tries to train; it must *then* be classed with the blights which cut off the development of the powers. To take a simple but familiar example, it is quite impossible to train children at any early age to do so easy a thing as to *sit still;* they have not developed the power of inhibition required for this. Later they develop this power and have no difficulty in the matter, even though not trained to do it. This is a type of what occurs throughout development." Jennings, *et al., Suggestions of Modern Science Concerning Education,* pp. 20–21.

2. Preyer, discussing the development of inhibition in his son, Axel, states it as his belief that the inhibition of an act is caused by a direct effort of will which impedes the act. Discuss Preyer's view and give concrete instances to illustrate your own view.

3. The accompanying illustration (Fig. 77) shows the changes that occur in the proportions of various bodily organs and members as the child develops. Suggest evidence showing that in the development of the mind there are similar changes in the proportions of the various powers, traits or faculties.

4. What inferences relating to the neurological aspects of inhibition may be drawn from the illustrations found on page 141

(Fig. 22) showing the appearance of the brain in the normal adult, in the child and in the idiot?

5. The picture on p. 144 (Fig. 23) presents a typical scene

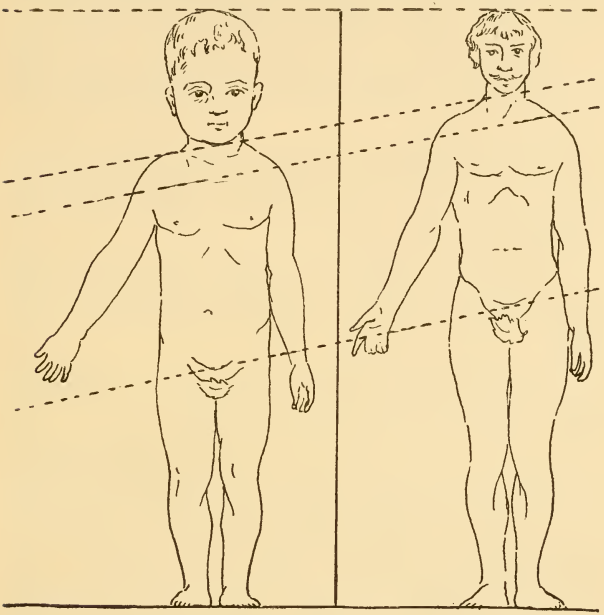

FIG. 77. — (See exercise 3.)

in a large city. Comment on the situation from the standpoint of the development of inhibition.

6. Are the games shown in the two pictures (Figs. 24, p. 147, and 25, p. 150) of equal value when regarded from the stand-

point of the development of inhibition? Give reasons for your answer.

7. Discuss the common saying, — "A child should be seen and not heard." How would you restrain children who apparently talk too much, either in the home or in the school?

8. Compare pupils who are quite active in a motor way with pupils of the same age who are very quiet. Which group is the "brighter"? Which group stands the higher in the work of the school? Why?

9. Describe a school in which the teacher attempts to suppress all motor activity. Do you think the pupils progress unusually rapidly in their studies? Do they enjoy their work? Is their behavior satisfactory?

10. Is there any objection to keeping children after school as a punishment for inattention to lessons during school hours? Is this a "natural" penalty for indifference to the work of the school?

11. Are the following statements true? If so, suggest how the practical problem involved can be solved.

Many persons who realize that a child must see, hear, touch, taste and smell all the objects around him in order that he may come to understand them do not appreciate that the hunger to touch things is probably more acute than any other kind of hunger. How often one hears parents and policemen and guards at museums say to children, — "Don't you touch that. Can't you keep your hands off things? I told you if you touched any of those things again I would punish you," and so on. But a child will touch objects, even in the face of certain punishment, because his hunger for touch sensations is so overpowering that he cannot restrain it.

12. Suggest an answer to each question in the following communication from a teacher, with reasons therefor:

"I have been much interested in trying to account for the

mischievousness of some of my pupils. They come from good homes; but they 'raise cain' all the time. Is this due to what is called *reversion?* Are these children evilly inclined by nature or is it due to lack of proper training in the home? If I were certain of the cause of wrong doing, I might be able to remedy it."

13. Comment on the method of treating children indicated in the following incident:

I heard a parent talking to two children who were traveling with her on a train. They were probably six and eight years of age respectively. The windows were all open because the weather was hot. The children were striving constantly to put their heads a little way out of a window. They were fascinated by this novel experience. They felt the air on their faces and they saw the objects fly past them at great speed. But the mother was incessantly commanding them to sit down and behave themselves. Her voice was harsh, rough and decidedly unfriendly. She took hold of the children several times and shook them and threatened them with more painful treatment if they did not obey her.

14. Do children who are leaders in their studies develop motor restraint sooner than duller children, or is it the other way around? Give reasons for your answer.

15. Comment on this boy's forgetfulness and his father's method of making him thoughtful:

"My brother, nine years old, plays out of doors constantly, and he is ravenously hungry at meal time. He has been told a hundred and fifty times to brush his hair before coming to the table and still at nearly every meal father has to say, — 'Isn't there something you should have done?' The answer always is, — 'Oh, papa, I forgot.' "

16. Explain the following type, and suggest methods of training:

In every home in which there are several children, there is likely to be a more or less marked irresponsible one. It is always possible to tell when such a boy has been in the house; he leaves a trail after him. He has cut his finger, and has used cloths to remove the blood. You can track him around the house by the cloths he has dropped on the floor. He has changed his clothes to go to a party, and one can find everything he has taken off right where it dropped when he shed it. He reads the paper before any other member of the household, and he leaves the various sections scattered all over the room. He takes tools to fix his boat, and when the father wishes to use these same tools he cannot find them. He climbs a tree and forgets to remove his new coat, which is much the worse for wear when he returns to the house. When he goes to the pantry to relieve his hunger he consumes everything he can find, whether or not it has been specially prepared for the approaching meal. He wanders around in sloppy weather wherever his impulse takes him, and he comes in with wet feet. He pulls off his shoes and socks in the parlor or living room, and sits around *en déshabille* regardless of the other members of the family. He gets absorbed in a book and forgets all about his studies, and his teacher reports him as negligent. He goes out just before a meal, and comes back after everyone has finished, much to the annoyance of the servants.

17. Select at least three persons, men or women, who are generally regarded as leaders in their respective fields of activity, and find out whether they were reflective and studious or executive and dynamic during childhood and youth.

18. Would such a school as is described below be of service in every city? Why? Would it be of service also in country districts? Why?

There is a school for discontented school children in Kansas City, Missouri, called the "Lathrop Industrial School." It

was organized for the purpose of educating children over fourteen years of age who have reached the fifth grade and find the work of the regular school distasteful. The school proceeds on the theory that in many cases the distaste of these children for school is due to the fact that the ordinary studies are not adapted to their particular needs. Such pupils frequently appear "backward" or lazy, when in reality all they need is a different form of educational activity. Accordingly, Lathrop school gives them what is known as "prevocational" training. Courses in bench woodworking, shop-drawing, pattern-making, printing, carpentry and shop electricity are provided for the boys; cooking, sewing, millinery and embroidery for the girls.

19. Sometimes one sees pupils who habitually sit in their seats during recesses studying their lessons; they never take part in the play activities of their classmates. Should anything be done to cause such pupils to play at recesses? What principles are involved?

IX

THE DEVELOPMENT OF INHIBITION: RESTRAINING FORCES

1. SHOULD girls be given as much freedom for motor activities as boys? At what age should they begin to be restrained? How can they be trained best in proper restraint?

2. Are parents wise in compelling their children to restrain themselves when company is present for fear of having them thought ill-mannered? Will the children be better-mannered in the teens if they are trained to observe adult proprieties in the early years?

3. Comment on the following:

"H— while quite young was compelled to attend many lectures. He had to sit quietly without moving a finger even while the lecturer talked on subjects far beyond his comprehension. Now that he has grown older, and is in college, he finds it very difficult to sit quietly at a lecture; he is always nervous and fidgety."

Did his experience as a child probably have any influence on his present dislike of lectures?

4. Develop a general principle stating when a person would be ideally restrained in respect to laughter, freedom of speech, dress, indulgence in sweets, tea and coffee, tobacco, dancing, etc. Could one be too restrained in respect to any or all of these matters?

5. Is the development of restraint in the young helped or is it hindered by permitting them to participate in street festivals, *mardi gras* celebrations, masque-balls, New Year's Eve festivities and the like?

6. Have you known a person to develop self-restraint without very much being said to him directly about the matter? If so, just what experiences did he have that brought about self-control?

7. Many people believe that a school is well governed when pupils sit quietly in their seats, memorizing their lessons. Is this your view? If not, say when a school is well disciplined and why.

8. Should a pupil exercise greater restraint in the high school than he did in the elementary school? Give the principle upon which your answer is based.

9. Is it wise to compel children under twelve to attend church and sit through sermons which they do not comprehend? Is there any connection between compulsory church attendance in the early years and attendance or non-attendance in later years?

10. One often hears college students say, — "Well, you know we went out on that picnic and we had the *best* time; we acted just like 'kids' again!" Discuss the psychological and educational significance of such experiences.

11. What inferences relating to the development of self-restraint may be drawn from the illustration (Fig. 22, p. 141) showing views of the brain of a normal adult, of a child and of an idiot?

12. Suggest explanations of the traits of the two types of boys described below and indicate how each should be treated:

(*a*) "I have a pupil thirteen years of age who cannot sit still in his seat for a moment at a time. He is shifting about, knocking his feet against the desk, turning around and looking at people and whispering to them whenever he gets a chance, 'fussing' with various articles which he brings to school in his pockets, and so on. He is not getting along well in his work; he cannot give his attention for more than a few minutes at a time to any-

thing. He gets along fairly well outside of school because he is alert and responsive; he is as good as any one in his group in play."

(*b*) "I have a boy in my school who does all his work in the school more readily than his classmates, and when he finishes a lesson he gets into mischief very easily. He moves around in his seat, makes a good deal of noise by knocking his feet against the desk, dropping his books, communicating with the pupils around him, and so on."

13. Are the following statements true? If so, suggest a program for training the young which will obviate the difficulty complained of.

A large part of the conflict between parents and teachers and their boys in modern life is due to the fact that the former supervise the latter too much. This difficulty is increasing with the development of urban life. In earlier times, when the majority of children lived in the country, they were permitted to shift for themselves a considerable part of each day. They could be out of doors away from adults for hours at a stretch. In those days parents were always so busy that they did not have much leisure to follow their boys around and tell them what they should or should not do. But an increasing proportion of children who live in the city have almost no time to themselves. They are under the eye and the voice of grown persons from the time they get up in the morning until they retire at night. And the typical adult cannot be with a boy of any age without constantly giving him instruction or exhorting him or commanding him or 'bossing' him in one way or another. A large percentage of boys who are regarded as obstinate, disobedient or unmanageable are oversupervised. They fall into the way of thinking that no adult can be near them without commanding them or forbidding them; so they acquire a fixed attitude of antagonism and resistance toward those in authority.

14. Discuss the following testimonies from inmates of state prisons:

(*a*) "Sending a boy who has committed some crime to a juvenile institution ruins him. He will learn more crookedness in one month in a house of refuge than he would in all his life on the streets, and going from a house of refuge to a reformatory is like going from a public school to a high school."

(*b*) "I was sent to an industrial school for truancy and was kept there seven years. When you send a child to a reform school you make a criminal out of him, for what badness he does not know he will soon learn while there. I have been serving time ever since."

(*c*) "I attended school very little. I was interested in stories of crimes and thieves. At thirteen I was sent for one year to a house of refuge. At seventeen I was arrested for petty larceny. I was herded with a lot of criminals and sent to a penitentiary for six months. If I had not been sent to the house of refuge it would have helped me to live right. I learned more about thieving in one year than I could learn out of books in twenty years. Keep young boys away from homes and refuges. The causes of my crime have been cigarettes, evil companions, trashy books and no idea of the seriousness of what I was doing."

(*d*) "The best thing to do with a boy when he starts to steal is to take him to a near-by lot and shoot him. If that had been done to me I'd be better off to-day. All reformatories are nothing but schools of crime." Schoff, *The Wayward Child*, pp. 191–195.

15. Treat the quotation given below as follows: first, give evidences for or against the soundness of the propositions set forth; second, suggest how the traits mentioned should be provided for in educational work; third, show how the views presented relate to the problem of developing self-restraint in the young:

"The power to throw with accuracy and speed was once pivotal for survival, and non-throwers were eliminated. Those who could throw unusually well best overcame enemies, killed game, and sheltered family. The nervous and muscular systems are organized with certain definite tendencies and have behind of them a racial setting. So running and dodging with speed and endurance, and hitting with a club were also basal to hunting and fighting. Now that the need of these is less urgent for utilitarian purposes, they are still necessary for perfecting the organism. This makes, for instance, baseball racially familiar, because it represents activities that were once and for a long time necessary for survival. We inherit tendencies of muscular co-ordination that have been of great racial utility. The best athletic sports and games are composed of these racially old elements, so that phylogenetic muscular history is of great importance. Why is it that a city man so loves to sit all day and fish? It is because this interest dates back to time immemorial. We are the sons of fishermen, and early life was by the water's side, and this is our food supply. This explains why certain exercises are more interesting than others." Hall, *Youth: Its Education, Regimen, and Hygiene*, pp. 79–80.

16. Compare the advantages and disadvantages of work on a farm for boys in the early teens with work in a factory or in a store.

17. When a girl of thirteen or fourteen years of age is dropping behind in her school work and taking to the streets, will it help her to punish her or to attempt to shame her into decent behavior? If a girl has become an offender by the age of sixteen, will it cure her to send her to a penal institution where she will be made to work?

18. Give evidence bearing either positively or negatively upon the following statements:

Recent investigations indicate that good behavior depends

largely on intelligence. If an individual stops growing mentally at fourteen, the chances are that by the time he is nineteen or twenty he will be an offender against law or morality if he lives in a community where life is complex, and self-restraint is required. This is particularly true of girls.

19. Frequently one hears a parent or teacher say that a boy or a girl has undergone a marked change for the worse in character during the early teens. Mention the chief kinds of delinquency that are likely to occur at this time, and suggest explanations and methods of avoiding deterioration in character.

X

ACTIVITIES PECULIAR TO ADOLESCENCE

1. COMMENT on the following quotation from Swift, pointing out especially whether the trait described is confined to the adolescent age:

"The principal of a New York school puts truants under the care of active citizens of the school republic who formerly were themselves truants. The boys know how to find runaways, and when once truants have been discovered, former delinquents are skilful in handling them. Besides, there is a sympathetic bond between the two that appeals to the truant. The feeling that authority and force are unfairly used, which arises so easily in police control of truancy, is absent." Swift, *Youth and the Race*, p. 53.

2. Comment on the following statement from Starr, giving attention principally to the suitability for adolescents of the suggestions made:

"Over-pugnacity is certainly a bad trait, but a cowardly refusal to fight when necessary is worse, and every healthy boy at or about the age of twelve years should be taught to box in order to hold within bounds and discipline the fighting tendency. With bad associations removed, boxing is a very manly art. It trains the muscles, cultivates quickness of eye, hand and foot, increases decision, will-power, self-reliance and self-restraint. It lessens nervous irritability and greatly amends passionate, peevish and effeminate dispositions." Starr, *The Adolescent Period*, pp. 17, 27.

3. What games and plays are particularly well suited to ado-

lescent boys? To adolescent girls? Indicate the characteristics of the games and plays you mention that make them especially suitable for adolescents.

4. What is the meaning of "growing pains"? Are boys as well as girls afflicted in this manner?

5. What faults are boys peculiarly subject to during adolescence? Are girls subject to the same or to different faults? Explain.

6. Curves are given on p. 170 (Fig. 26) showing the rate of annual increase in endurance, vital capacity, weight and grip of right hand. What inferences may be drawn from these curves, taken singly and collectively, relating to adolescence?

7. Does Coleridge indulge in poetic license in the following quotation in which he contrasts youth with age, or does he confine himself closely to facts?

> "Crabbed age and youth cannot live together.
> Youth is full of pleasures, age is full of care;
> Youth is like summer morn, age like winter weather;
> Youth like summer brave, age like winter bare;
> Youth is full of sport, age's breath is short,
> Youth is nimble, age is lame,
> Youth is hot and bold, age is weak and cold,
> Youth is wild and age is tame."

8. Is the following incident reported in the New York *Times*, for May 5, 1910, quite common or is it unusual?

"Five boys, ranging from fourteen to fifteen years old, were arraigned before Justice Hoyt, sitting in the Children's Court, yesterday, charged with improper guardianship. After the judge had heard their stories, they were remanded to the Children's Society until Saturday.

"On Tuesday afternoon a policeman of the West Forty-seventh Street Station saw the boys acting suspiciously in the

freight yard of the New York Central Railroad at the foot of West Fifty-seventh Street. He watched them for some time and saw the five climb into an empty freight car attached to a train that had just started to move. He then arrested them.

"When the boys were searched, an emergency kit was found containing one roll of six-inch gauze bandages, two boxes of pills, one package of court-plaster, two bottles of cough-mixture, two bologna-sausage rings, and three loaves of bread.

"In court yesterday the one who acted as spokesman said that they had formed a club some time ago to get the necessary things to beat their way West. When asked what they intended to do with the bandages, he said, 'You can't tell what will happen to you when you get West, and we didn't want to take any chances. We figured that we could get grub from somewhere, but if we got mixed up in a wreck or caught cold, bandages and medicines would be the things we would need.'" Quoted by Swift, *Youth and the Race*, p. 12.

9. Are the traits described below typical? Suggest explanations of the traits. How should they be treated?

"A woman whose home is in Marion, Illinois, has asked the chief of police to assist her in finding her daughter, fourteen years old, who disappeared from her home a week ago, after telling some of her girl friends that she proposed to become a female detective. The girl took twenty-three dollars in cash with her.

"Just before she left home she wrote to her best girl friend and told her of her intentions. After she arrived in Saint Louis, she mailed another postal card to her chum, but there was no indication of where the girl was living in this city.

"The conductor on the train on which the girl came to Saint Louis told the police that she represented herself to be an orphan and said that she was on her way to visit an aunt. She paid her fare and the conductor gave her no special attention.

"The girl was sixteen years of age. She was the daughter of

respectable, hard-working parents. Her father kept a small shop and by frugality and close attention to business maintained his family in comfortable circumstances and sent his children to school. The town was so large that the school children knew nothing about the home life of many of their associates. This enabled the daughter to weave the following exhilarating romance into her life.

"Her father and mother, the girl told her school associates, spent most of their time in Europe. When they were not traveling abroad they lived in their summer cottage in Michigan, and, by way of helping the imagination of her friends to picture her luxury, she showed photographs which she had purchased of a pretty summer cottage.

"She arranged a girls' box party at the theater, at her own expense, and invited one of the teachers to accompany them as chaperon. The money to defray the expenses was skillfully purloined from the till of her father's shop which she was required to tend after close of school. Of course, her guests must be supplied with flowers, but this caused no serious difficulty, as a relative kept a greenhouse in which she was frequently left alone. The box party became somewhat complex, however, because she could only tell her family that she was going to the theater, and her mother, naturally, could not allow her to go alone. But she was equal to the emergency and proposed that her older sister accompany her. On their arrival she told her sister that one teacher was giving a box party and had invited her to sit with them. She then joined her school friends and chaperon in the box.

"Of course, the romance would not have been complete without a devoted young admirer. So she gave her girl friends the name of one of the officers of the street railway company, which she found on a transfer. Occasionally she pointed him out, always selecting some young man who was just disappearing in

the distance. She also displayed flowers which he had sent to her, roses that she had secretly taken from the greenhouse of her relative. Several times she said that he had invited her to take a drive with him and had told her to ask a girl friend to accompany them. A sudden message, however, invariably called him back to business, and his disappearing form was always pointed out. Meanwhile he had left the horse and carriage — which she had hired with money taken from her father's money drawer — in front of the school building." Swift, *Youth and the Race*, pp. 25–26.

10. Judge Lindsey, of the Juvenile Court of Denver, believes that boys guilty of lawlessness can be reformed by making them responsible for the good behavior of others. Discuss the following case which he cites in his *The Problem of the Children*, p. 107.

"In a certain suburb of Denver, where the smelters are located and there are a great many cheap saloons selling bad liquor and tobacco to children, two celebrated gangs brought to the juvenile court for dangerous forms of rowdyism and lawlessness not only completely suppressed every serious objectionable act among themselves, but also went after the men who were selling liquor and tobacco to boys. They prosecuted and sent several to jail, and did more to stop the use of tobacco and liquor among boys in that neighborhood than the police department or civil authorities had done in the history of the town."

11. Should pupils in a high school take a part in making rules for their own government? What are the advantages and the disadvantages of pupil self-government?

12. Suggest an explanation of the cause of delinquency described by Healy in the following account of an incident which occurred in a school in Washington:

"In a certain school which the children from the families of prominent officials and diplomats attended, during a number of weeks there occurred a series of remarkable thefts. Many

things were taken, — books, school supplies, bicycles and other things belonging to the children. Valuable articles were also taken from the neighborhood. Now, what stood in the way of early detection of the delinquents was that they were not even considered as being the possible offenders. When the affair was finally run down it was found that about fourteen or fifteen boys with creditable previous records, of good school standing, many of them coming from notable families, had steadily been plundering. They had a cave or retreat to which the goods were taken and from which they were recovered. The pecuniary side entered very little into the transaction, for while some articles had been sold, yet the amount derived had been nothing comparable to the sums readily obtainable from the parents by these same boys. The whole affair was essentially one of predatory adventure carried to an extreme by individuals who came from family circumstances that offered no possible excuse for the stealing." Healy, *Honesty*, pp. 79–80.

13. How would it do to adopt a policy that no boy or girl should be graduated from a high school who showed marked physical defects? Suppose this could be impressed upon pupils in the freshman class; would they give attention to the matter and come through at the end of the high-school course in better physical condition than some of them now do?

14. Comment on the following:

In some high schools, most of the pupils are not permitted to use the gymnasium after school hours because it is needed by the teams. The teams are trained every day, though they are least in need of training. In such high schools the boys who most need exercise have only one or two short periods a week. If these outcasts do manage to get up a team, they cannot very well take care of themselves. In some schools the physical training teachers devote nine-tenths of their energies to a few boys on the teams who are not greatly in need of their services.

15. Is the following situation common in high schools? What might be done to remedy the evil described?

In some schools the only road to distinction lies through athletic superiority. One can hear pupils in such schools say: "We want to make the team. One can't have any standing in this school unless he can get on a team. If I can't make a team, I am going to drop out of school."

16. Granting that the statements made in the following paragraph are sound, suggest how a parent or teacher should proceed to secure a modification in the actions of a boy who is a member of a group and who patterns after group models:

Probably the judgment of a boy who has reached the teens is sounder in respect to many of his activities and relations than is the judgment of his parents. A father may arbitrarily tell his fifteen-year-old boy how he ought to stand or walk or talk, wear his hat or his trousers, whether he should have girl companions, what studies he should elect, and so on; but the boy aims to follow more or less closely the models set by the group of which he is a member. The father is not a member of the group, and so he does not know its ideals, customs or practices. The father tries to enforce the views of his own mature group upon his boy, who is a member of an immature group. The boy knows that if he adopts the actions of the grown-up group he will be *persona non grata* with his own group.

17. Point out the advantages and the disadvantages, if any, of such a daily program as is described below for all boys in the teens:

Practically every detail of a boy's life in a military school is regulated by a fixed program. He rises in the morning at six o'clock when reveille is sounded. He is given from three to five minutes to dress. At the end of this time, he must respond to roll call either for drill exercises or gymnastics. Next he has his cold spray. He is given five minutes or so to get into his

uniform. He probably then will have some more drill, after which he will march to breakfast. He stands at his place at table until he is commanded to be seated. He comes to attention upon military command, and listens to the orders for the day. He rises from the table upon command and marches with his fellows for more drill. He is then probably given ten or fifteen minutes of freedom, at the end of which time he falls into line in his company. He marches to his classroom, sits upon military command, and is at attention throughout the recitation. He rises upon command, marches to his next class or his next duty; and so he goes on until taps are sounded at 9:30 at night when his lights must go out. He may have one or two hours during the day when he is at leisure to go about without being under orders, but during the rest of his time he is under military command.

Under a military régime every required action must be performed exactly on time, and according to fixed standards. The uniforms must be clean, every button must be in place, and the clothes must fit the person according to the military style. If there is any neglect or deficiency in this respect, a definite penalty is assigned. The hands and face must be clean, the hair combed, the shoes brushed, the linen must be immaculate, or penalties are assigned. No cadet ever "talks back" in regard to any of these matters. The superior officer inspects and decides whether or not a cadet has conformed to the requirements. If the cadet is ten seconds behind time at any exercise; if he shows the slightest discourtesy toward any officer; if he becomes negligent or indifferent either in the classroom or in his military exercises he is reported for misconduct and penalized.

18. Comment on the relations between adolescent boys and the girls shown in the foreground of the accompanying picture. (Fig. 78.) Should such relations be allowed? Should the relations shown in Fig. 27, p. 182, be encouraged?

19. In the following passage Jordan and Kellogg describe the phenomena of courtship among certain species of animals; may similar phenomena be observed in human life during the adolescent period? Point out implications of your answer so far as adolescent boys and girls are concerned.

"The instincts of courtship relate chiefly to the male, the female being more or less passive. Among many fishes the male struts before the female, spreading his fins, intensifying his pigmented

FIG. 78. — Unwholesome relations of adolescent boys and girls. (See exercise 18.)

colors through muscular tension, and in such fashion as he can makes himself the preferred of the female. In the little brooks in spring male minnows can be found with warts on the nose or head, with crimson pigment on the fins, or blue pigment on the back, or jet-black pigment all over the head, or with varied combinations of all these. Their instinct is to display all these to the best advantage, even though the conspicuous hues lead to their own destruction. Against this contingency nature provides a superfluity of males.

"Among the birds the male in spring is in very many species provided with an ornamental plumage which he sheds when the breeding season is over. The scarlet, crimson, orange, blue, black, and lustrous colors of birds are commonly seen only on the males in the breeding season, the young males and all males in the fall having the plain brown gray or streaky colors of the female. Among the singing birds it is chiefly the male that sings,

FIG. 79. — Each boy has a patch of ground of his own which he is required to cultivate. (See exercise 22.)

and his voice and the instinct to use it are commonly lost when the young are hatched in the nest." Jordan and Kellogg, *Animal Life*, pp. 248–249.

20. Show whether each of the principles mentioned below is based on established principles of adolescent development. Suggest an educational regimen suited to an unstable girl in early adolescence.

The crucial epoch in a girl's life comes between fourteen and seventeen. If she has any unsteadiness of mind it will be likely to manifest itself at that time. The turning point in the career

of girls who are sent to reform schools comes at about fourteen. Such profound changes take place then that there is a tendency for the mind to "wander." Dull tasks in home or school are duller at this time than at any time before or after this period. Nature evidently intended that a girl should live the romantic life during these transitional years.

FIG. 80. — The favorite place for the gang is an out-of-the-way vacant lot. (See exercise 23.)

21. Suggest practical applications to the training of boys of the following from Healy:

"We have heard this hundreds of times if we have heard it once, namely, that stealing was never done except under the individual's habitual social reactions in company with others. Let a boy live in a neighborhood where the boys go upon the railroad tracks to steal, as they do in cities; it may be desperately hard to break up this habit, as many a city policeman knows. Since these boys have done this thing together before, and it has afforded the crowd exhilaration and adventure, whenever they come together, just from habit, their thought turns to the old scene of exploits. The pertinacity of such a habit, even after warnings of many kinds, is astonishing." Healy, *op. cit.*, p. 109.

22. Which would boys of the ages shown in the picture (Fig. 28, p. 183) prefer to do, — play with a St. Bernard dog or play

pool? Account for the boy's interest or lack thereof in the dog as compared with the pool.

23. Would the boys of the age shown in the picture (Fig. 79) prefer to cultivate a garden of their own if they could have one rather than to run the street or loiter around poolrooms? Why?

24. The boys shown in the accompanying picture (Fig. 80) spend a considerable part of their time in this vacant lot. Describe the activities in which you think they engage. Suggest a program for the community to follow in the treatment of this gang.

XI

DYNAMIC EDUCATION: GENERAL PRINCIPLES

1. Show the bearing on the question of dynamic education of the following quotation from Royce:

"When in the presence of familiar objects, such as our pen, our watch, our knife, our dictionary, or our bunch of keys, if we examine the image that these objects awaken in us as we observe them, we may often find images of a more or less obviously motor type — images which take the form of the tendencies to conceive to ourselves certain familiar acts which these objects call up in our minds. Thus the pen may arouse the image of grasping the pen for the purpose of writing, the knife may suggest cutting, and so on. In brief, the whole normal life of our imagination has a most intimate connection with our conduct, and should not be studied apart from conduct. The central processes which our images accompany form themselves a part of our reaction to our environment, and our more organized series of mental images actually form part of our conduct." Royce, *Outlines of Psychology*, p. 159.

2. Comment on each of the following quotations from men who have strongly influenced education in modern times. Say whether the view presented by each is in accord or is in conflict with the principles developed in the text.

"The objects themselves, or, where this is not possible, such representations of them as can be conveyed by copies, models, and pictures, must be studied. In the case of the languages, arts, morality, and piety, impression must be insured by expres-

sion. 'What has to be done, must be earned by doing.' Reading, writing and singing are to be acquired by practice. The use of foreign languages affords a better means of learning them than do the rules of grammar. Practice, good example, and sympathetic guidance teach us virtue better than do precepts." Comenius.

"In thus relieving children of all their school tasks, I take away the instrument of their greatest misery, namely books. Reading is the scourge of childhood, and almost the sole occupation that we know how to give them. At the age of twelve, Émile will hardly know what a book is. But I shall be told that it is very necessary that he know how to read. This I grant. It is necessary that he know how to read when reading is useful to him. Until then, it serves only to annoy him." Rousseau.

"I believe that the first development of thought in the child is very much disturbed by a wordy system of teaching, which is not adapted either to his faculties or the circumstances of his life. According to my experience, success depends upon whether what is taught to children commends itself to them as true through being closely connected with their own observation. As a general rule, I attached little importance to the study of words, even when explanations of the ideas they represented were given." Pestalozzi.

"We do amiss to spend seven or eight years in scraping together so much miserable Latin and Greek as might be learned otherwise easily and delightfully in one year.

"Though a linguist should pride himself to have all the tongues that Babel cleft the world into, yet if he have not studied the solid things in them as well as the words and lexicons, he were nothing so much to be esteemed as any yeoman or tradesman competently wise in his mother dialect only." Milton.

"Those who have handled sciences have been either men of experiment or men of dogmas. The men of experiment are like

the ant; they only collect and use; the reasoners resemble spiders who make cobwebs out of their substance. But the bee takes a middle course; it gathers its material from the flowers of the garden and the field, but transforms and digests it by a power of its own. Not unlike that is the true business of philosophy; for it neither relies solely or chiefly on the powers of the mind, nor does it take the matter which it gathers from natural history and mechanical experiments and lay it up in the memory whole, as it finds it; but lays it up in the understanding altered and digested. Therefore, from a closer and purer league between these two faculties, the experimental and the rational (such as has never yet been made), much may be hoped." Bacon.

3. How does the following quotation from Professor James relate to the general problem of a dynamic as contrasted with a static program of education?

"The inessential 'unpractical' activities are themselves far more connected with our behavior and our adaptation to the environment than at first sight might appear. No truth, however abstract, is ever perceived, that will not probably at some time influence our earthly action. You must remember that, when I talk of action here, I mean action in the widest sense. I mean speech, I mean writing, I mean yeses and noes, and tendencies 'from' things and tendencies 'toward' things, and emotional determinations; and I mean them in the future as well as in the immediate present." James, *Talks to Teachers*, etc., pp. 26 and 27.

4. Amplify the following sentences from Professor James so as to show concretely whether or not he conceives of education in the manner in which it has been presented in Chapter XII:

"An 'uneducated' person is one who is nonplused by all but the most habitual situations. On the contrary, one who is educated is able practically to extricate himself, by means of the examples with which his memory is stored and of the abstract

conceptions which he has acquired, from circumstances, in which he never was placed before." James, *op. cit.*, p. 29.

5. Suggest applications of the following to the problem of dynamic education:

"An Atlantic liner encounters a fearful storm, and there is great danger that the vessel may be lost. There are brave men among the passengers as well as among the officers and crew, yet the latter remain calm, while the passengers are on the verge of a panic. The captain on the bridge knows equally as well as the merchant in the cabin what the storm means, but the captain is without emotion, as he firmly issues his orders, while the merchant is so nervous that he cannot follow the hand at cards which he is playing. The difference in the conduct of these two men is to be explained largely by the fact that the officer on the bridge is doing something to help the situation, while the man below deck is helpless. He has no effective mode of action to meet the situation, hence his strong feelings discharge themselves ineffectually and fill him with emotional excitement. If he could do something, he would at once become a brave man. Effectual doing always removes fear." Colvin and Bagley, *Human Behavior*, p. 82.

6. Does Tyler go beyond the facts, so far as we know them to-day, when he speaks of the benefits of play in the following terms?

"Play furnishes the very best mental training. Watch even a game of tag. The sense-organs are all alert. The attention is focused on one point. This is the best means of training the will, for close attention to one thing is one of the best forms of will-power. The child must 'size up' the situation, and grasp the opportunity once and for all. He cannot 'stand shivering on the brink of action,' as the adult so frequently does. Thinking, willing, and doing are united, not separated. The same movement is repeated until perfected, and with undiminished

interest. The child forgets himself, and loses shyness and self-consciousness in the game. As he grows older, the opportunity for skill, thought, plan, and strategy constantly increases. On the play-ground he learns far more than the rudiments of the science of success in life." Tyler, *op. cit.*, pp. 208–209.

7. If the following is true, give concrete illustrations of the principle:

Féré maintains that the whole body "thinks" when the brain is in action. Contemplation at any rate implies more than seeing or hearing or imaging in a narrow sense; it implies that the child gains an appreciation of what the eye and ear give and what images mean because of certain effects which these exert upon vital action.

8. What defense can be made for the schools in —— mentioned below?

"A certain man in —— criticized the schools because, as he said, we were doing too much 'outside' work. He thought it was nonsense to send the eighth-grade boys on the school ground to measure its perimeter and then calculate the cost of putting up a board fence or a cement walk around the ground. Others have criticized botanical, geological and physiographical excursions."

9. Point out the differences in opportunities for mental development in the homes of fifty years ago as compared with those of to-day, and in city as compared with country homes at the present time.

10. Why has the notion become so prevalent that a child to be *good* must be quiet?

11. Why are kindergartens furnished with tables and chairs instead of stationary desks and seats?

12. Comment on the view maintained by some educators that the school is not intended to fit for life, but *is* life?

13. Is there value in teaching children motions in singing and reciting?

14. Is the following statement true? If so, what are its educational implications?

When a child is occupied in an interesting way, his nerves will gain poise and stability. Many children are made nervous because they have nothing interesting to do, and they are continually restless. They become discontented and peevish, and they are likely to irritate the mother or teacher and this will in turn increase their nervousness.

15. Suggest educational implications of the following quotation from Professor Watson:

"One of our students at Hopkins allowed nearly one hundred animals of different ages to learn a very complex maze, taking the while an accurate record of the number of trials required to master it. The animals were divided into four groups; a twenty-five day old group, which is the age at which they become independent of the mother; a sixty-five day old group, or the age of sexual maturity; a two hundred day old group, which might represent the middle of adult life; and a three hundred day old group, to represent the beginning of old age. The twenty-five day old rats and the sixty-five day old rats, which represent our most youthful groups, learned the maze in approximately thirty trials; whereas the two hundred and three hundred day old animals required nearly a third more trials — about forty-two. The young animals required about six seconds for their finally perfected runs; the old groups required about ten seconds. These experiments show clearly two things; first, that, as everyone has hitherto suspected, the young animals do learn faster than the old ones; but in the second place, that the old animals can learn very fast indeed, all things considered. We have continued these experiments with a few very old animals and we find that animals even five and six hundred days old still have the ability to learn this complicated maze." Jennings, *et al.*, *Suggestions of Modern Science Concerning Education*, pp. 91–92.

16. In view of the statements in the following quotation from Professor Jennings, comment on the daily régime of the school you know best:

"Keeping the child sitting still for hours at a time, as we do in our schools, — and particularly when this is done in stagnant air, as is usually the case, — has a most marked and immediate effect in decreasing appetite (and thus shutting off nutrition); in decreasing respiration, in decreasing resistance to blights, in a general suspension or slowing of physical development. These are not mere loose general statements; precise facts and figures showing these effects could be presented if time permitted. The sitting posture when long continued is most abnormal and harmful for the growing child; to demand it for many hours a day is a crime. From this point of view the changes required in our system of cultivation are: more activity, frequent alterations of position, frequent periods of play or of moving about; more manual work in place of inactive study." Jennings, *et al.*, *op. cit.*, pp. 41–42.

17. In an older day it would have been regarded as a waste of time for a teacher to take her pupils to a blacksmith shop (Fig. 29, p. 190). How do you view this matter? How have you gained your views?

18. Comment on the value of arithmetic to a pupil who has never had opportunity to employ it in practical situations — whose experience with it has never extended beyond the text-book.

19. Can one teach commercial arithmetic to pupils so that they will *use it as they acquire it?* Or if taught must it be acquired by definition and by solving book problems? Give instances to illustrate your answer.

20. Point out the difference in methods in teaching writing in a dynamic and in a static way.

21. How may French, as a typical foreign language, be taught

dynamically? Compare two pupils who have been taught French for the same length of time, one in a static, verbal way, the other in a dynamic way. How will they differ in their mastery of the language?

22. Why is it that so many Americans who have studied French or German or Spanish for two, three or even four years cannot express themselves intelligibly when traveling in France or Germany or Spain?

23. Show how the dynamic method may be applied in the teaching of (*a*) history, (*b*) literature, (*c*) physics.

24. Compare the high schools and the elementary schools in your locality. Which, so far as you can observe, are the more vital and dynamic in their teaching? What are the evidences upon which your opinion is based? Suggest an explanation of the facts as you find them.

25. If there is any difference, say which is easier to present in a dynamic manner, the studies in the elementary school or in the high school? Is dynamic teaching as essential in the high school as in the lower schools? Why?

26. Has dynamic teaching been introduced into the Sunday school? Comment upon the situation as you find it.

27. Apply the principle contained in the following quotation from Professor Watson to the problems of teaching writing, piano playing, and the like:

"The subjects were all forced to shoot five hundred times; in other words, the total amount of practice was the same for all groups. The groups were all carefully selected, none of the subjects having had previous practice on the English long bow and all having about the same degree of initial efficiency. After each shot was made, the distance of the arrow from the center of the bull's eye was measured. The subjects were thrown into the following groups: one group had to shoot five times per day; another twelve times per day; another twenty; and the fourth

forty. The final accuracy of the last twenty-five shots was chosen as a measure of the amount of improvement which had taken place. The results strongly confirm those already reported for the rat; the group shooting five times a day could shoot approximately twice to three times as accurately as the group having to shoot forty times per day. There seems to be no ques-

FIG. 81. — Dynamic methods of teaching pyramids and cones. (See exercise 40.)

tion but that this law is universal in its application." Jennings, *et al.*, p. 8.

28. Comment on the value in schools of debating societies for training in the use of English. May they serve any other useful purpose?

29. If you are not an artist, could you reproduce a drawing better if you observed it being made than if it were set before you completed? What is the principle involved?

30. Comment upon the following: A pupil is not writing well. The teacher puts a copy on the board, and asks him to

reproduce it. Upon his failure to do so satisfactorily she upbraids him, says he is careless, and she commands him to give better attention. As a punishment she keeps him after school, and requires him to practice his writing by looking at the copy and trying to imitate it.

31. Is it best to require pupils to observe a copy *as they try to reproduce it*, or to study it first, and then reproduce from

FIG. 82. — Learning how to take care of a baby. (See exercise 43.)

memory? Should pupils acquire habits of reproducing rapidly or reproducing slowly? What principles are involved?

32. Is the following a typical case? What would you advise a teacher to do in such circumstances?

The writer observed a teacher recently teaching a pupil to pronounce the word "Ypres." The boy had previously seen it and he had pronounced it as it looked, which was not quite right since the pronunciation does not exactly follow the spelling. The teacher stood in the front of the room and the pupil was at the rear; the former pronounced the word as a whole, and the

latter tried to imitate it, but he pronounced it the way it looked. He really heard it as it looked, since the latter got established first. The teacher pronounced it several times, and the boy made the same mistake each time. The teacher then became impatient and criticized him, but with no good results.

33. How much of what was taught you in grammar have you retained? Can you recall and apply the rules you learned?

FIG. 83. — There is something to learn even about making a bed. (See exercise 43.)

Comment on the facts revealed in your reflection upon the results of your study of this subject.

34. Which is more static in its method of teaching, the country school or the city school? Which offers the greater opportunity for dynamic teaching? Comment on the situation as you find it.

35. Can agriculture be taught in country schools so that it will have meaning and vitality for the pupils? Is it so taught? Explain the facts as you find them.

36. Which requires the greater preparation and skill on the teacher's part, — a static or a dynamic method of teaching? Why?

37. Suggest how the use of newspapers and magazines may contribute to the dynamic teaching of civics, history and geography.

38. Discuss the problem involved in the following:

Why is it that pupils do not more readily take to the reading that we have to put them through in the schools? If left to themselves, they do not choose this reading. But it is the best literature and pupils ought to like to read it. It seems that children ought to take to the best literature in our language instead of having to be coaxed into it. I sometimes doubt whether we succeed in coaxing them to read the best authors.

39. Can the type of work in measurement shown in the illustration on p. 192 (Fig. 30) be commended? Why?

40. Do you approve of the method of teaching pyramids and cones as shown in the picture? (Fig. 81.)

41. What are the advantages and disadvantages, if any, of the type of work for boys in a consolidated rural school as shown in the illustration on p. 194? (Fig. 31.)

42. Suggest a practicable program for training the fourteen children from fourteen different foreign countries to be intelligent and patriotic Americans. (Fig. 32, p. 199.)

43. Should work of the character shown in the two pictures (Figs. 82 and 83) be offered in all schools in which there are girl students? Why?

XII

DYNAMIC EDUCATION: THE RÔLE OF SUGGESTION

1. In her treatment of an individual's errors, as in falling down stairs, does nature depend upon suggestion or upon direct command and punishment?

2. Should the phenomena described by Keatinge in the following quotation be regarded as illustrating (*a*) suggestion or (*b*) imitation? What is the essential difference between the two?

"If I see a number of people streaming through a gate, I feel a natural tendency to follow, and the more the individuals of which the crowd is composed resemble me, the greater is this tendency. Unconsciously I infer that what interests people whose mental constitution is like my own, will also interest me. In the same way, I experience a tendency to wear the same hats as my fellow-countrymen, and in particular, as those whose conditions of life and whose incomes are similar to my own; but I have not the least wish to adopt a Chinese or Mexican head-gear. Similarly, a number of sheep will follow one another into a field, but will not follow horses, cows, or men." Keatinge, *Suggestion in Education*, p. 88.

3. Cite concrete instances within your own experience similar to those given below illustrative of the fact that suggestion may affect the functions of bodily organs.

"A person who believes he has been pricked by a pin feels the sting and makes a movement of protection. One who believes his food to have been prepared in a disgusting way experiences repugnance and may vomit solely in consequence of the idea. In a series of tests of the electrical excitability of

various persons, Dubois used a non-active unconnected battery, and yet he found that most of his subjects, thoroughly believing the electric current had been applied, were able to give accurate descriptions of sensations which might have been expected only from an active battery and which ranged from a slight tingling or burning up to unbearable pain." Jacoby, *Suggestion and Psychotherapy*, p. 148.

4. Is there any relation between hypnotism and suggestion, as the latter is treated in the text? Teachers are sometimes said to control their pupils by "hypnotism"; have you known such a case? If so, describe precisely the teacher's method of operating on the pupils and their response.

5. What is meant by "mesmerizing" animals or human beings? Hindoo "miracle-men" are said to be able to "mesmerize" vicious snakes; try to find out what basis of fact there is in this widespread belief.

6. Does anything occur in everyday human life resembling the actions of horses in the Russian St. Petersburg stampede of 1871, as quoted by Sidis?

"On the second night of the campaign an unlucky accident occurred. . . . A regiment of the Empress's Cuirassiers of the Guard, nine hundred strong, had arrived at their cantonments. One of the squadron of horses became alarmed, broke away, was followed by the next squadron, and, a panic seizing them all, in one instant the whole nine hundred fled in wild disorder. . . . Two things were very remarkable in this stampede. In the first place, they unanimously selected one large, powerful horse as their *leader*, and, with a look at him and a snort at him which they meant and he understood as *après vous*, they actually waited until he dashed to the front, and then followed in wild confusion. When I tell you that some of the horses were not recovered till they had gone one hundred and twenty miles into Finland, you may imagine what the panic was.

"The second remarkable thing is the way that some of them were stopped. In *one solid mass* they dashed on for miles, and then came directly, at right angles, on a river. In front of them was a bridge, but on the other side of the bridge was a sort of *tête du pont* and a small picket of cavalry. The horse which *led* would not face the bridge, seeing the cavalry at the other end, but turned to one side, dashed into the stream, and the whole nine hundred horses swam the river *together*. As they emerged and flew wildly on, the commander of the picket bethought him of a *ruse*, and ordered a bugler to blow the *appel*. This is always blown when the horses are going to be fed. . . . All the old horses pricked up their ears, wavered, stopped, paused, turned round and trotted back. . . . This severed the mass. . . ." Sidis, *Psychology of Suggestion*, p. 317.

7. Could the problem presented in the following letter from a mother have been solved better by suggestion than by the use of physical force? Indicate the procedure which should have been followed.

"I have a little son four years old. One day a friend was visiting us. My little boy had a book that he was interested in. My friend asked him to let her see it. He did not refuse in words, but would not hand her the book. I asked him several times to do it, and finally took him away and spanked him; then I gave the book to my friend myself, and then put him to bed an hour earlier than his usual time. Next morning he was his usual sweet self, but I did not feel as though I had done right, and yet I felt there was no other way unless I ignored it entirely."

8. Outline a program, based on suggestion, of dealing with sullen boys, as described below:

"What is the best way to deal with the sullen boy? The problem is an ever recurring one, to me at least. This year I have several boys, who, as soon as anything displeases them, — an unwelcome task, the refusal of some request, or a reprimand,—

slam their books, jerk and shiver about, mutter, and remain sullen for some time."

9. Can Kirkpatrick's views regarding contrary suggestion, as given in the quotation below, be defended? Do his explanations of the child's attitude of resistance toward the suggestions given him seem to you to be sound?

"At about three years of age *contrary suggestion* often appears, and at more or less frequent intervals controls the child's action. He not only refuses to do what others do, and what it is suggested that he shall do, but as far as possible does just the opposite of what the imitative impulse would impel him to do." Kirkpatrick, *Fundamentals of Child Study*, pp. 135–136.

10. Below is given an account of the influence of dress on the behavior of a group of boys. Is this influence due to suggestion? Would the principle apply in the case of clean hands and face, well-combed hair and the like?

In a certain fourth-grade room in a public school there were a number of boys who had been giving their teacher considerable trouble. They were rough in the school and made a good deal of noise in going to and from classes and even while they were in their seats. They would knock their boots against the sides of their desks, with the result that they annoyed the pupils around them and irritated the teacher, who was a highly-organized young woman and who had been accustomed to refined ways in the people about her.

The writer had a chance to observe these boys at close range, and they were really good at heart, but they did not fit in very well with the restrained and restricted régime of the schoolroom. Outside of the schoolroom they lived a rather rough, masculine kind of life. They wore thick-soled boots which alone would meet the needs of their vigorous activities out of doors. For the same reason they wore coarse clothes which would withstand rough usage. Their parents could afford a different kind of

clothing for them, but the boys preferred what they had because then they were not scolded if they tumbled in the snow or even accidentally fell in the mud.

During the winter it was suggested to the teacher that the boys should be required to remove their heavy boots while in the schoolroom and wear slippers, or else to have rubber heels put on the boots. The parents sympathized with this request and it was complied with. It has had a marked effect upon the behavior of the boys. The wearing of slippers has softened their manners; coarse, heavy boots seem inevitably to induce a noisy, rough manner.

The principle applies to clothes as well as to footwear. The boy who comes in from his rough out-of-door games should take off his coarse clothes and put on others which are ordinarily worn under conditions where there is some restraint. Practically every individual, whether child or adult, unconsciously assumes good behavior when he puts on his Sunday clothes. He thinks of himself in terms of his clothing, though he is not usually conscious of this.

11. Is the procedure indicated in the following note based on suggestion? If so, indicate other ways in which the principle could be advantageously applied:

In the Montessori schools the children become quiet and relaxed several times during each day. At a sound on the piano the room is darkened, heads droop, and the children are relaxed for five minutes or so. Then at another sound on the piano the curtains are raised and the children are active again. This suggests a method which might be adopted in all homes. When nap time comes the mother should darken the room and hold her child quietly for a few minutes, perhaps stroking his head and crooning so as to give an air of quiet and monotony. Then when the nervous system is soothed the child will probably relax and fall asleep.

12. How could one effectively change the set of mind of a boy who had acquired the habit of resisting any suggestion given him by his father, as described in the following note?

A father may keep nagging his son because he wears caps of a certain color, size and shape. All the boys in his group wear caps of this sort, but they do not satisfy the father's notions of what he himself likes. So every time the boy puts on his cap the father makes adverse comments, and says: "You must not pay any attention to what the boys say. I know better than they do what is good style, and I know that that cap is not suitable for you. You must not permit boys who have no taste to determine what you will wear." In nine cases out of ten the boy will continue to wear the cap that his group approve, but he will be irritated by his father's attitude. Every day he will develop resistance to his father's wishes and commands. He may finally reach the stage when he will automatically resist any suggestion that is made because he expects it will be something which is contrary to the practice of his group. One frequently sees boys who are in this resistant attitude toward every suggestion made by the adults in their households.

13. Is the following explanation of the interest of young persons in moving pictures accurate and adequate? Is the interest based on suggestion?

One can observe a love-making scene on the screen and in a way he can project himself into it and live in it, much as though he were himself the chief actor. He can observe deeds of heroism, as the saving of a life, or the killing of a lion, or the whipping of a bully, and for the time being the observer is the hero; he has something of the same pleasure that he would have if he were the real hero. This is particularly true of children who have not developed the power of inhibition to a high degree, and whose impulses are constantly surging up and demanding gratification. A young person is entranced when he can withdraw

from the conventional life around him and live in adventurous, romantic, heroic, comic and amorous scenes. For the time being he is a *bona fide* participator in these dramas. He does not appreciate that it is all make-believe, and that he is simply an onlooker. He is right in the midst of things. When there is bloody work going on he is not sitting back at a safe distance and watching the scene. He hears the groans of the victim, and he experiences active and positive feelings toward the murderer. Tears flow down his cheeks in compassion for the unfortunate, and he rejoices with the hero and the heroine as though they were performing before him in the flesh.

14. Is it essential for the development of the individual's character that he should be subjected freely to temptation? Try to secure a reliable answer to this question, — Are the most upright and moral persons in maturity those who have been exposed to temptation most frequently in their early years?

15. Restate the following paragraphs from Clark, in your own phrasing, and point out the relation of Clark's views to the principles presented in the text:

"One person cannot exert educative influence upon the life of another mechanically; that is, he cannot manipulate the factors of the life as he handles things in his material environment. He cannot dissolve a state of consciousness by the introduction of a reaction agent with the definiteness and certainty of a chemist. He cannot force into the life of another an element wholly foreign to it, and hence he cannot control that life *from without*. All his control must be exercised through elements found within the life itself and by means of the life's own normal activities. One may knock at the door, but he cannot force an entrance; it is only as the life itself gives him welcome that he can participate in it. The teacher cannot give his 'knowledge' to his pupil; he can only express what he knows, *i.e.*, *what he is*, in the hope that his pupil may be induced to know, *i.e.*, *to be*, some-

thing similar in general content and form. A man's knowledge is himself, and it cannot be transferred, either *en masse* or in its elements, to another; also the pupil's knowledge is his own creation, the manifestation of his own life, and cannot be appropriated mechanically from the experience of another. Each person's character is unique in its individuality. It *grows* naturally through simple life-functioning and cannot be *made* by external manipulation." Clark, *Suggestion in Education*, pp. 46–47.

16. Keatinge maintains, in the quotation given below, that it is impossible to prevent a child from receiving and acting upon suggestions from one source or another. Comment upon Keatinge's views, pointing out especially how it is possible to avoid the prejudice described in the last sentence of the quotation.

"It is, in the first place, impossible to withdraw a child from all suggestive influences, unless he is brought up in air-tight isolation. He will receive suggestions from servants, from companions, from shop-windows, from the life that he sees in the streets. The efforts that are sometimes made to bring up a child with an impartial mind on matters of religion, morality, or politics, in order that he may be free to take his own line when he is of a fit age to judge, are bound to end in failure. From birth he is exposed to contagion on every side, and long before he reaches maturity will be tinged with prejudices which render true impartiality of judgment difficult if not impossible." Keatinge, *Suggestion in Education*, pp. 185–186.

17. What proportion of individuals chosen at random would be as suggestible as Mr. S., described by Dr. Sidis? Make some experiments on at least one of your associates to determine if he or she is as responsive as Mr. S. Explain the facts revealed by your experiment.

"In the case of one subject — Mr. S., one of the ablest men in the Psychological Laboratory — I found that my order was carried out in a reflex way; so much so that a few times, when I

called out 'Strike!' 'Hammer!' the hand went down on the table instantaneously and with such violence that the table was nearly shattered. Mr. S. felt pain in his hand for some minutes. On one occasion I called out, 'Look there!' Quick as lightning Mr. S. turned round and looked hard. On another occasion I commanded, 'Rise!' Back moved the chair and up went Mr. S." Sidis, *Psychology of Suggestion*, p. 35.

XIII

OVERSTRAIN IN EDUCATION: WASTEFUL PRACTICES

1. If you write much with a fountain pen, try the plan of using a close-fitting rubber tube drawn over the part grasped by the fingers when you are writing, making it about one half an inch in diameter. Note whether you can write with greater ease with the device.

2. How long at one period can children of six years write with medium-pointed pens without overstrain? Can they write for a longer period at seven years? at eight? How can one tell when they are becoming fatigued?

3. From the standpoint of economizing nervous energy, describe the materials pupils should use, speaking of pens, pencils, paper, sewing utensils, etc.

4. Should high-school students be required to do much precise work with the microscope? Should they be held for precise work in draughting?

5. Are "fancy work," knitting, sewing, and the like to be recommended as recreation for girls who are in school five hours a day? Mention beneficial exercises for such girls, with reasons.

6. Speak in detail of the methods you would adopt in preventing wasteful postures of pupils in the schoolroom. Comment on the postures shown in Figs. 36, p. 235; 37, p. 236; 38, p. 237.

7. Try this experiment: find among your companions one who wears quite "strong" glasses to correct a different defect from your own, if you have one. Put on these glasses for a little time and note results. What is the relation between eye-strain

thus artificially produced and that resulting from defective vision?

8. If you can do so, secure from all your associates who wear glasses a statement of their experience with defective vision. What difficulties has the wearing of glasses corrected? What influence have glasses had on their emotional life?

9. What would you say to parents who object to having their children who have defective vision wear glasses, maintaining that they will outgrow their trouble as they get older?

10. Pay a visit to the nearest elementary and high school, and find out what proportion of the pupils wear glasses. What is suggested to you as a result of your inquiry?

11. Are long recesses valuable for the release of tension? Are they beneficial in respect to mental efficiency immediately after the recesses? What is the value of long gymnastic periods for the release of tension and for mental efficiency?

12. Are the school buildings in your neighborhood in the vicinity of playgrounds where the pupils may play at recess? If not, how do they secure relaxation during the school day?

13. Comment on the following situation: A school building is located on a busy street, but is surrounded by a strip of grass. The teachers forbid the pupils to step on the grass; and they also warn them against playing on the street. They must keep out of the way of pedestrians and vehicles, and they must not shout or make any noise which will disturb residents or passers-by. Further, the pupils are forbidden to run or play or shout within the building during intermissions.

14. May gymnastic exercises be made a substitute for recesses? Why?

15. What is the effect on the expenditure of energy of the practice, alike in elementary and in high schools, of having a class recite where others are studying? Discuss this matter from the standpoint of those who study and also those who recite.

16. What are the effects of formal examinations on conservation of energy? Which is preferable, the frequent quiz or infrequent examination?

17. In some schools the pupils loiter about the halls during recess and before and after school. Would a teacher be justified in sending these pupils out to play? Why?

18. How is the establishment of out-door schools related to conservation of energy?

19. A certain school has a twenty-minute recess each morning and afternoon and a noon intermission of one hour, but no other periods of relaxation during the school day, while another school has no long recess but three-minute periods of relaxation between classes. Comment on the two plans from the standpoint of conserving energy.

20. Two classes under the same instructor have the same work to do. The first class, which meets at nine o'clock in the morning, is well on with its work and its standard is high. The second class, which meets at 1:30 in the afternoon, is behind in its schedule; and although some of the members are among the best students in college the standing of the class is low. What may be the reasons for the difference in the work of the two classes?

21. Say first whether Patrick's views as set forth in the following paragraph appear to be well grounded. Then point out the bearing upon the program of daily life of the principles you regard as sound:

"In fact the world has lately been getting too severely serious and laborious. Too much hard thinking is demanded to keep up the modern pace. Whether in journalism, in literature, in scientific research, in mechanical invention, in social and educational reform, in labor movements, or in the feverish struggle for wealth, the higher brain is taxed to a degree incommensurate with the possibility of physiological adjustment. Our physical

constitution cannot so quickly adapt itself to this suddenly increased demand upon certain specific nervous functions comparatively new and unstable. Reactions of one kind or another are therefore inevitable." Patrick, *Psychology of Relaxation*, p. 88.

22. Illustrate the following passage from Gould by assuming the postures which he describes and say whether or not the principles presented are of importance in avoiding waste in school work.

"The pathology of school life in a multitude of symptoms and diseases consists for the greater part in the unhygienic attempts to see the writing-field with the dominant eye. And the two great blunders of all the teachers and desk-makers are that the penholders and pens are not shaped so that the writing space or field about the pen-point can be seen with both eyes when the body and head are erect; or that the desk is not inclined at an angle of about 30°, and the writing paper is not placed squarely and opposite the right shoulder, with the body and head erect and squarely postured before the desk. With the paper so placed, the desk top so inclined, the body and head thus erect, the right eye sees the paper at 12 inches or 14 inches, and the writing is vertical." Gould, *Right-handedness and Left-handedness*, p. 161.

23. Point out the bearing of the following passage from Gould upon the question of requiring a left-handed pupil to write with his right hand, or *vice versa:*

"A little closer observation soon demonstrates that not only is the right-handed person also right-eyed, but that he is usually right-footed, and right-eared. This is equivalent to saying that a person is either dextro-expert, generally, as to ear, eye, hand, and foot, or else he is sinistro-expert. There must manifestly be a unity in the coördinations of all acts, and such coördinations would evidently be better with a habitual one-sided similarity of execution running through all kinds of action, so that there

would be no indecision in rapid and dangerous acts. The unity and the resultant promptness and accuracy of all motions is thus enhanced by a synchronous dextro-expertness or sinistro-expertness. The mixed type, illustrated by the so-called ambi-dextrous, would place the organism at a wretched disadvantage in the struggle for existence, and in the social struggle of the highest types of civilized life." Gould, *op. cit.*, p. 183.

24. Is it important to have one or more dental clinics as a part of the equipment of the public school system in every town

FIG. 84. — One method of lighting a schoolroom. (See exercise 25.)

and city? Why? Should there be a township or county clinic for rural school pupils?

25. Comment on the lighting shown in the accompanying picture (Fig. 84.)

26. What may be the cause or causes of the postures shown in Fig. 61, p. 254?

27. What postural habits are likely to produce the physical defects shown in Fig. 85?

28. Show in as great detail as possible how fatigue is manifested in the people about you.

29. Study those you know who exhibit fatigue "nerve-signs," and see if you can tell what has been the principal factor in causing their fatigue.

30. Make out a list of the ways in which you think people in general and pupils in particular waste their energies.

31. Observe those about you who seem always to have an abundance of energy for any tasks to be performed. Are they on the whole less or are they more active than persons who are in a depleted condition? What is the secret of their being able to keep a stock of energy on hand?

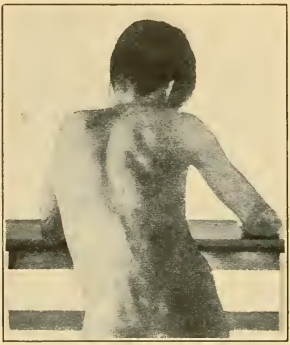

FIG. 85. — Curvature of the spine is frequently seen in school children. (See exercise 27.)

32. Do persons who enjoy their work ordinarily suffer from nervous depletion? Compare them in this respect with persons who regard their work as drudgery. Discuss the principle involved as it relates to the school.

33. Do those who have the least play and freedom from strain in their lives consume the most tea, coffee and tobacco as compared with persons of leisure and comfort?

34. Is it a fact that "society" women are more subject to nervous breakdown than women who have much less leisure and more work? Explain.

35. Is *compulsory* physical exercise likely to be beneficial?

36. If pupils are permitted to play only the games in which they are most interested, will they secure an all-round physical development?

37. Is too much claimed in the following quotation for rhythm as a means of saving wear and tear in action:

"Thus rhythm is a narcotic, putting the keener sensibility to sleep, shutting off the higher mechanism and leaving the rest of the machinery to run on without unnecessary wear and tear. And rhythm has through the possession of this property saved millions of toilers from death by slow torture, and has been a great blessing to the race. When the end has been decided on and the road stretches far ahead, it is a boon to have this good fairy descend, wrap us in her cloud, and carry us through as in a sleeping car. It is well that the captain can sometimes set the course and go to sleep." Lee, *Play in Education*, p. 155.

38. Do the most active men and women in present-day life indulge most liberally in alcoholic drinks, or is the reverse true? Do the most diligent and successful students drink the most or the least when compared with the loafing and pleasure-loving students? Certain classes of persons, as actors and actresses, miners, the socially "élite," cowboys, reporters on urban daily papers, and so on, are heavy drinkers as compared with teachers, ministers, judges and the like. Explain the facts in view of Patrick's theory that people indulge in alcoholic drinks in order to secure relaxation.

39. Comment on the following: "I have never been able to recite well in class since I was in the fourth grade. One of the other pupils did not know his lessons for two or three days and the teacher lost his temper the third day. He severely whipped the child before the whole school, and this made such an impression on me that every time I was called upon thereafter I became so frightened that I was hardly able to speak. I have outgrown the fear, but still I am never able to recite well. Nervous energy is lost every day I am in a school where I have to recite."

40. A young teacher walked six miles a day to and from school. After teaching from 9 A. M. till 4:30 P. M. she went

home and prepared supper for the family. Then she planned her work and corrected papers till bedtime. What do you think of a program like this for a teacher?

41. Discuss the psychology of anxiety, and show why it increases tensions.

42. Do we regard any book as great that tends to increase man's anxieties? Take your favorite book, and speak of it from this standpoint.

43. What musical selections are most quieting in their influence upon you? What ones tend to arouse you most vigorously?

44. What musical instruments are most soothing to you? What ones stimulate you? Do any of them irritate you? Why?

45. What kinds or qualities or characteristics of music please children of different ages most? What airs quiet them when they are excited? What ones excite them? Study this matter on the street, in the schoolroom and in the home.

46. Do children enjoy solo singing? Are they affected chiefly by the masculine or by the feminine voice? Do they enjoy chorus singing?

47. How are you affected when you are in a house filled with bric-a-brac? Are you affected differently when you are in a house more simply furnished? Comment on the facts as you find them.

48. Will maps and pictures hung at all angles in a schoolroom affect the poise and nervous tension of teacher and pupils? Explain.

49. What color does one usually find in rest rooms? Why?

50. Can a color or form combination to which a child does not object produce wasteful tension?

51. What are the physical and æsthetic qualities you would demand in a teacher in order that he might conserve the energy of his pupils?

52. In a certain business college the students listen to music every day during the penmanship hour. It does not seem to distract their attention from their work and they enjoy it. Comment on this practice.

53. Should highly colored pictures such as "The Thin Red Line," "Washington Crossing the Delaware," "Custer's Last Fight," etc., be hung in the schoolroom?

54. Can the following statements be justified? If so, on what grounds?

There should be vacation schools in every town and city in our country. This does not mean that every child in America should be in a school during the summer. But every child of school age who has no employment, or who is not able to travel or to spend his time in learning the mysteries and delights of nature as presented in the fields or in the woods or on the shores of a river or a lake, would be helped by spending from two to four hours every week-day in a vacation school.

55. Would you be willing to give the following advice to pupils? Why?

"Just as a bicycle-chain may be too tight, so may one's carefulness and conscientiousness be so tense as to hinder the running of one's mind. Take, for example, periods when there are many successive days of examination impending. One ounce of good nervous tonic in an examination is worth many pounds of anxious study for it in advance. If you want really to do your best in an examination, fling away the book the day before, say to yourself, 'I won't waste another minute on this miserable thing, and I don't care an iota whether I succeed or not.' Say this sincerely, and feel it; and go out and play, or go to bed and sleep, and I am sure the results next day will encourage you to use the method permanently." James, *Talks to Teachers*, etc., pp. 222–223.

56. Suggest feasible and effective methods of dealing with the problem described below:

In modern life many children are so restless that they cannot sit or stand quietly for even a brief moment. The nervous system becomes so excitable that these tense children must be doing something every second; and unfortunately, this ceaseless activity tends to aggravate nervous strain. A child who is moving constantly in his seat or who cannot stand quietly for a few seconds is likely to go from bad to worse.

57. Do you approve of the following suggestions? Why?

All pupils should have experience in trying to control restlessness. It is undoubtedly under the control of the will to a certain extent. Any pupil should be able to sit still for half a minute, probably not with the arms folded because this suggests strain, but with his hands on the top of the desk, say, and with his whole body relaxed. In the same way he should be able to stand quietly with the body relaxed for half a minute. He should be able to do this even with his eyes shut, which is a very excellent sort of training for the nervous system. If he cannot stand for half a minute under these conditions, let him begin with a quarter of a minute, and let the length of the period be continually increased.

58. What can be said for or against the method of seating shown in Fig. 62, p. 255? Speak of the seat and the desk, singly and in relation to each other, and the position of the pupil.

59. Comment on the following from Alexander. Are the statements correct? If so, how can the evil complained of be avoided?

"Suppose a pupil is asked to stand upright and take a 'deep breath.' It will be found that he immediately makes movements which tend to retard the proper action of the respiratory processes rather than to promote such action. For instance, it is almost certain that in the attempt to make the movement referred to he will stiffen the muscles of his neck, throw back the head, hollow the back, protrude the stomach, and take breath

by audibly *sucking* air into the lungs. The muscles over the entire surface of the bony thorax will be unduly tensed, tending to more or less harmful thoracic rigidity at the very moment when the maximum of mobility is needed. How could the result be otherwise?" Alexander, *Man's Supreme Inheritance*, p. 201.

60. How may laughter be employed to relax tensions developed in the schoolroom? Mention typical incidents which produce laughter in pupils of different ages, and say whether these incidents should be created by the teacher for the purpose of relaxing tensions.

61. Could cartoons, as described in the following from Patrick, be employed in the schoolroom to relax tensions?

"In nearly all cartoons, situations in our highly complex and involved political and social life are graphically translated into simple and racially familiar scenes. Constant use is made of the poultry-yard, the farm-yard, the stable, the fish-pond, the swimming-hole, the wood-shed, the kitchen, the breakfast-table, the sick-room, and every kind of domestic or rural scene. Animals such as the mule, the cow, the cat, the hen and chicks, the ducks and geese, all racially familiar, but now disappearing from our city life, greet us again in the daily cartoons and bring us corresponding joy. So also appear the familiar apple and pear trees, the vegetable garden, the old pump, the grindstone, the birch rod and the slipper, and the doctor and his bottle of medicine, the cradle and the grave." Patrick, *Psychology of Relaxation*, pp. 120–121.

62. It is the popular view that people drink beer, whisky, wine, etc., for the stimulation they derive from alcohol. Discuss this popular view in connection with the view presented by Patrick below:

"Alcohol is stimulating, not directly, for its physiological action is wholly depressive, but indirectly by inhibiting the higher

mental processes and setting free the older and more primitive ones. Thus, alcohol appears as a depressant of voluntary attention and effort, of logical associations and abstract reasoning, of foresight and prudence, of anxiety and worry, of modesty and reserve, and the higher sentiments in general, while, on the other hand, it acts indirectly as an excitant of speech, and laughter, and song; of emotional feeling and expression; of sentimentality; and in increased doses, of still older and more basic impulses, such as garrulity, quarrelsomeness, recklessness, immodesty; and finally, of coarseness and criminal tendencies." Patrick, *op. cit.*, p. 207.

63. Do the young indulge in profanity because they are overstrained? Are the most profane persons those who are most tense or inhibited? Should parents and teachers tolerate and even encourage the use of profanity by the young as a means of relaxation?

64. What is to be said for and against the methods of inducing pupils to relax, as shown in Figs. 63, p. 258, and 64, p. 260?

65. Suggest evidence in support or in denial of the following from Professor James:

"The American overtension and jerkiness and breathlessness and intensity and agony of expression are primarily social, and only secondarily physiological, phenomena. They are *bad habits*, nothing more or less, bred of custom and example, born of the imitation of bad models and the cultivation of false personal ideals." James, *Talks to Teachers*, etc., p. 212.

66. Read the following; then study carefully the pupils in the school you know best, or study your associates, and see if you can observe the effects of undue strain which Professor Jennings mentions. Describe the signs you rely upon in determining whether one is suffering from overstrain:

"This driving of the powers beyond what they are prepared for leads to the most serious difficulties, particularly if the child

is very conscientious or nervous, and so aids in driving itself. Forced into this one channel, the bodily energy stops attending to its other duties. Appetite disappears; the body no longer can attend properly to nutrition; the chemical processes of the body get into confusion; poisons are produced instead of protective substances; resistance is broken down; the bacterial blights gain a footing; the nervous system functions badly. The beginnings of such troubles are shown in the twitchings of the face or limbs that are so common. We hardly realize how close we keep our children in school to this precipice of overstrain; many of us see even the manifest symptoms appear without realizing what they mean." Jennings, *et al.*, *op. cit.*, pp. 44–45.

XIV

OVERSTRAIN IN EDUCATION: CONDITIONS AFFECTING ENDURANCE

1. WHAT effect upon a boy's mental efficiency and endurance would the habits of living described below have? What course of training should be followed with such a boy?

M. overindulges in everything that appeals to his palate. His parents do not restrain him adequately because he is their only son and heir and they want him to have a "good time." This boy eats mainly soft, mushy, sweet foods, and soft white bread, always leaving the crust. He will not eat any dark bread, or any food with a rough element like bran. He will not touch fat meat, or any vegetables except mashed potatoes. His parents were advised that he should eat baked potatoes in order to secure the minerals which are usually lost in mashed potatoes; but the boy says baked potatoes are "horrid." He shines mainly when it comes to desserts, and he will ask for two or three helpings of any sweet thing on the table. The family frequently have desserts requiring chocolate dressing. The boy will overindulge in such desserts, and he will lie awake at night because he is overstimulated, and yet the next day he will indulge to excess again.

2. A certain mother having a twelve-year-old son and a fifteen-year-old daughter will under no consideration let them eat anything between meals. During the cold weather they come home from school ravenously hungry; still they are compelled to wait until supper to appease their hunger. Comment on the mother's plan.

3. A fourteen-year-old girl after spending most of her time from 8 : 30 to 4 o'clock in school must practice her music for two hours when she gets home. Is this plan to be commended?

4. Are the conditions complained of below typical? If so, how can they be improved?

The writer recently inspected a rural school in a prosperous section of the state of Iowa. It would be difficult to overstate the unhygienic conditions in and about this school. The building was located in a swampish spot, which had been set aside for the school because the ground was not good for raising crops. The floor of the hovel was so much out of repair that one had to be careful not to step through the holes. There were numerous cracks in the walls which let in gusts of zero air. There was an unjacketed stove in the middle of the room. The children who sat near it were about 125 degrees on one side and 50 degrees on the other; it would not have been surprising if they had split open. The ceiling and walls had been whitewashed in an ancient day, but no one would have suspected it, for the dirt of ages had accumulated on them. In the corner of the room there were a foul-looking water-pail and a still fouler-looking dipper from which all the children drank. The seats were ill adapted to the children who sat in them.

5. Is the evil complained of below widespread? Suggest methods of controlling it.

A prominent cause of physical and nervous instability among children is over-indulgence in sweets. While it is true that the system can assimilate a certain amount of sugar, still the quantity is quite limited. When a child goes to excess in the use of sugar it acts as an irritant in the organism, and instead of nourishing him it dissipates his energy. Children who overindulge in sweets often lose flesh, partly because an undue amount of sugar overtaxes the eliminative organs and upsets the bodily machinery. Athletes are not permitted to indulge heavily in

sweets, for when they do they become flabby, "lose their breath" easily and their endurance declines. A distinguished scientist has recently said that at least one third of the energy of American people is wasted on account of the excessive use of sweets. He maintains that a considerable part of disease in modern life is due to the irritations developed by sugar.

6. Comment on the desirability and practicability of the suggestion contained in the following:

Before the war broke out a movement was started to utilize the roofs of buildings for playgrounds. When our cities were built no thought was taken of using roof space in this way, and so most roofs are not adapted to this purpose. But a survey of roof facilities in some cities has shown that, with but little modification, considerable roof space could be made well adapted to the needs of the young for playgrounds and gardens for physical training. Considering what an advantage it would be if children could be kept out of the noise and excitement and dust of the street, is it too much to hope that the time will come in every large town and city when a large part of the roof space will be devoted to the needs of the young?

7. Make practical applications to the daily life of the young of the principle presented in the following quotation from Professor Jennings:

"The chief thing we can do is to keep the child's resistance high. The bacterial demons are everywhere, but one child they blight, while another blossoms. The difference is one of resistance. The time will come when medical practice will be directed even more to the keeping up of resistance than to avoiding or killing bacteria. But what *is* resistance, and how is it to be kept high? No one, I think, would claim that men yet completely understand resistance. But it is clear that resistance is due to an activity of the body in preparing, when attacked by enemies, substances which poison and destroy those enemies, without at

the same time poisoning the body itself. And it seems to be the fact that for each particular enemy the body prepares a different poison, precisely fitted to destroy that enemy and no other. Now this is something that chemists are quite unable to do when working consciously, and you can imagine that it is a most difficult and delicate operation for the body. It is peculiarly subject to derangement in many ways, and the cost of derangement is death or severe injury. Particularly is it subject to that general rule of 'attention' which I gave above; if the powers of the body are too thoroughly taken up with other things; if there is continuous worry, fear, pain, hunger, cold, fatigue, nervousness, overexcitement, overstrain of any sort, — the delicate task of preparing a chemical which shall precisely resist the attacking germs fails; the bud is blighted." Jennings, *et al.*, *op. cit.*, pp. 29–30.

8. Comment on the value of fresh-air schools for all children. Are such schools particularly valuable for delicate children? Why?

9. In Fig. 65, p. 272, and Fig. 66, p. 274, different kinds of physical exercise are shown. Is one kind to be preferred above the others? Explain.

10. The pupil shown in Fig. 67, p. 284, was suffering from a headache at the time the picture was taken. Suggest possible causes of her trouble.

AUTHORS REFERRED TO OR QUOTED IN THE TEXT

Alexander, 387.
Aristotle, 150.

Bacon, 358.
Bain, 35–40.
Bair, 42.
Bancroft, 229.
Barnes, 327–328.
Bateman, 151.
Bateson, 61.
Bell, 141.
Burk, 128.

Carlyle, 243.
Claparède, 257.
Clark, 375.
Clouston, 251.
Coleridge, 345.
Colvin and Bagley, 299–300, 305–306, 310, 359.
Comenius, 357.
Compayré, 141.
Cooley, 47.
Crane, Stephen, 142.
Curtis, 143.

Darwin, 79–80, 243.
Daskam, Josephine Dodge, 142.
Dearborn, 266.
De Quincey, 243.
Dewey, 141.
Dresslar, 141.

Fabre, 61.
Féré, 360.
Field, Eugene, 142.
Freeman, 305; 330.
Freeman, Mary E., 142.
Froebel, 141.

Galton, 256.
Gilson, R. R., 142.
Gould, 241–246, 380–381.
Graham, 142.

Habberton, 142.
Hall, 141, 151, 342.
Healy, 349, 354.
Hegel, 150.
Höffding, 36.
Holmes, O. W., 142.
Holmes, S. J., 307, 313.
Hood, 142.
Huxley, 243.

Jacoby, 369.
James, 250, 252–253, 293, 311, 358, 359, 385, 388.
Jennings, 61, 332, 362, 389, 392.
Jordan, President, 30.
Jordan and Kellogg, 352.

Kant, 150.
Keatinge, 228, 368, 375.
Key, 228.
Kipling, Rudyard, 142.
Kirkpatrick, 294, 295, 298, 306, 371.

Le Bon, 173.
Lee, 292, 308–309, 383.
Lees, 315.
Lindsey, Judge, 348.
Lobsien, 228.
Locke, 141, 274.
Lubbock, 61, 308.
Lucretius, 301.

MacDougall, 48.
Maeterlinck, 54, 75.
Mantegazza, 322–323.
Marshall, 291.
Martin, 142.
McDougall, 293.
Mercier, 137.
Miller, 312, 316–317.
Mills, 61.
Milton, 296, 357.
Moore, 141.
Morgan, Lloyd, 37, 61, 312.
Mosher, 320.

Nesbit, 142.
Nesteroff, 228.

Oppenheim, 228.

Patrick, 297, 379, 387.
Peckhams, The, 61.
Perez, 134.
Pestalozzi, 141, 357.
Pfungst, 55.
Phillpotts, Eden, 142.
Plato, 69, 150.
Plutarch, 141.
Prentice, 241.
Preyer, 35, 48, 128, 130, 141, 291, 332.

Quintillian, 141.

Ribot, 137, 255.
Riley, James Whitcomb, 142.
Romanes, 313.
Rousseau, 141, 357.
Royce, 356.

Schoff, 341.
Schuyten, 228.
Shinn, Miss, 35, 128.
Sidis, 369, 375.
Spencer, 141, 228, 243.
Starr, 344.
Stuart, Ruth McEnery, 142.
Sully, 141.
Swift, 243, 245, 315, 344, 345, 346.

Thorndike, 61.
Trettien, 134.
Tyler, 330–331, 359.

Valentine, 228.

Wagner, 243.
Washburn, 61.
Watson, 61, 361, 363.
White, 311.
Wilson, President, 72.
Woodworth, 313–314.
Wordsworth, 296, 306, 309.

INDEX

Aches and Ills, constructive treatment of, 206–207.
Acquisition, 176–177.
Action, follows direction of attention, 205–206.
Adaptive Activities, primitive forms of, 35–53; trial-and-success, 33–46; helplessness of the infant, 35–38; first step in acquiring, 38–40; concrete example of acquiring a voluntary act, 40–41; learning involves excessive activity, 42–44; integration of simple acts into more complex adjustments, 44–45; nothing is learned *de novo*, 45–46; imitation, 46–53; imitation as a form of adaptive activity, 46–47; phenomena of mimicry, 47; when imitation begins, 48–49; apperception in imitation, 49–50; principle illustrated in adult imitation, 50–51; course of development with respect to imitativeness, 51–53; higher forms of, 54–76; generalization, 54–67; of animals, 54–57; types of intelligence, 57–58; sensori-motor response, 58–59; horse's responses depend upon visual, auditory, or olfactory cues, 60; quality of animal intelligence, 60–61; popular misconceptions regarding the abilities of animals, 61–64; illustrations of a dog's intelligence, 64–67; symbolization, 67–71; development of symbolizing activities in the child, 70–71; imagination, 71–74; ability of individual to develop free ideas, 71–72; ability to foresee consequences and adapt means to ends, 72–73; reason, 74–76; most important distinction between primitive and higher types of intelligence, 74–75; analysis and synthesis, 75–76.
Adolescence, activities peculiar to, 169–184; transformations occur abruptly during puberty, 169–171; boys form gangs, 171; boys interested in tribal activities, 172; boy's tribal interest will flourish only in the gang, 172–173; the larger the gang the more tribal its interests, 173–174; gang promotes pugnacity, 174; muscular contests, 174–175; stealing, 175–176; instinct of acquisition, 176–177; destruction of property, 177–178; plaguing people, 178; profanity and use of tobacco, 178; truancy, 179–180; swimming, 180; competition in games, 180–181; girls form "sets" which are only loosely organized, 181–182; activities growing out of sex-interest, 182–184; eagerness to find a job, 184.
Æsthetic Well-Being, 18–34. (*See* Motive Forces in Development.)
Aggression, 22–23.
Analysis, in adaptive activity, 75–76.
Ancestral Life, activities reminiscent of, 28–31.
Animals, adaptive activities of, 54–57; traits of intelligence, 60–61; popular misconceptions regarding, 61–64.
Apperception, in imitation, 49–50.
Arithmetic, principle of dynamic education applied to, 191–193.
Auditory Cues, animals' responses depend upon, 60.

Beautiful, choice of, 27–28.
"Blue Monday," 278–280.
Bodily Attitude, reflex effect of, 254–256.
Body, hardening the, 274–275.
Boisterous Games *vs.* indoor games for relaxation, 257–258.
Boyd, trainer of "King Pharaoh," 56.

Children, older, inhibited in drawing, 113–114.
Children's Misfortunes, intensified by suggestion, 207–209.
Citizenship, teaching of, in a dynamic way, 198–200.
Cleanliness, and health, 278.
"Clever Hans," "educated" horse, 54.
Clothing, interest in, for decoration rather than for protection, 13; rôle played by, in maintaining vigor, 284–285.
"Committee of Ten," on dynamic teaching of arithmetic, 192; on high-school teaching, 196.

"Committee of Twelve," on study of French and German, 196.
Communicate, passion to, 19–20.
Community, morals of, may be elevated or degraded by suggestion, 214–216.
Community Life, study of, 203–204.
Competition, in games, 180–181.
Concepts, free, controlled by ends to be attained, 73–74.
Conflict, of motive forces, 9–10.
Constructive Impulse, as a motive force, 24–26.
Coördination, the development of, 128–139; in infancy, 128–129; first stages in acquiring manual dexterity, 129–130; urge of development is toward extremities, 130–133; development of pedal control, 134–135; development of, in speech, 135–136; illustrated in child's use of sentences, 136–137; order of losing in degeneration, 137–139.
Cues, animal's responses depend upon, 60.

"Dead" Air, toxic effect of, 283–284.
Decoration, interest in clothing for, 13.
Degeneration, order of losing coördination in, 137–139; phenomena of, 151–153.
De Novo, nothing is learned, 45–46.
Diagrams, made by child in drawing, 114–116; always same for any given object, 116–117.
Dog, illustration of intelligence of, 64–67.
Drawing, acquisition of, much harder than language, 125–126; psychology of, 127.
Drawings, studies of children's, 110–112; children's, logical relations revealed in, 120–123.
Driving Forces, rôle of, in development. (*See* Motive Forces in Development.)
Dynamic Education, 187–217; general principles, 187–205; meaning of, 187; how the child is enabled to interpret the world about him, 187–188; principle illustrated in Montessori schools, 188–190; principle applied to all school work, 190–191; even formal studies can be taught dynamically, 194–195; dynamic methods in secondary education, 195–196; making rhetoric dynamic, 196–197; teaching of science in high school, 197–198; dynamic teaching of citizenship, 198–200; developing patriotism, 200–202; first step in developing love of country, 202; we are all members of one body, 202–203; study of community life, 203–204; rôle of suggestion, 205–206; constructive treatment of aches and ills, 206–207; one can intensify children's misfortunes by suggestion, 207–209; use of suggestion in the sickroom, 209–211; one's defects may be increased by suggestion, 211–213; morals of a community may be elevated or degraded by suggestion, 214–216; suggestion in the theater, 216–217.

Emotions, expression of complex, 81–83; organic accompaniments of, 84–85.
Endurance, conditions affecting, 263–287; handicaps to, 263–264; why people differ in, 264–265; training for mental, 265–266; training can be overdone, 266; "off days," 266–269; new times bring new problems, 269; law of economy in developing and maintaining organs, 269–271; organs that are not used tend to degenerate, 271; intelligence is in the ascendancy, 271–273; price of "refined" training, 273–274; hardening the body, 274–275; new social conditions, 275–276; over-eating and under-cleaning, 276–278; health and cleanliness, 278; "Blue Monday," 278–280; energy in relation to indoor air, 280; the requirements for good ventilation, 281–283; toxic effect of "dead" air, 283–284; rôle played by clothing in maintaining vigor, 284–285; energy in relation to indoor temperature, 285–286; arranging a heating system, 286–287.
Energy, in relation to indoor air, 280; in relation to temperature, 285–286.
Englishmen, freedom of expression, 92.
Environment, vying with hereditary forces, 32–33.
Experiences with Persons, passion for, 18–19.
Expressional Activities, 77–127; vocal, 77; indefiniteness of first efforts at expression, 77; featural, 78–97; ready-made means of expression, 78–79; Darwin's view of the origin of expression, 79–80; expression of complex emotions, 81–83; organic accompaniments of emotion, 84–85; James-Lange theory, 86; child's expression intense but of short duration, 86–88; adult expression subdued but enduring, 88–90; expression becomes subdued with development, 90–91; women more expressive than men, 91–92; racial differences in expression, 92–93; expression of thought,

93–96; reflection involves strain and effort, 96–98; gestural, 98–106; purposeful expressional activities, 98–99; figurative gesture, 99–101; gesture in conveying ideas of quality and of action, 101–102; gesture to emphasize feeling, 102–103; relation of gesture to language, 103; individual differences in the use of gesture, 104–105; graphic, 106–110; the development of a sign language, 106–107; development of linguistic symbols, 107–110; pictorial, 110–127; studies of children's drawings, 110–112; difficulty of representation no barrier to expression, 112–113; older children are inhibited, 113–114; child's diagrams embody most essential characteristics of objects, 114–116; always the same diagram for any given object, 116–117; special characteristics of objects not included in diagrams, 117–120; logical relations revealed in children's drawings, 120–123; difficulty in representing special relations, 125; language acquired more easily and naturally than drawing, 125–126; psychology of drawing, 127.

Extremities, urge of development toward, 130–133.

Eye, in relation to nervous waste, 240–242; maladjustment of lens, 242–243; effects of eye-strain, 243–246.

Fairhope School, 191.

Fear, as a protective agent, 14–15; as a motive force, 15–17.

Feeling, use of gesture to emphasize, 102–103.

Fine Work, waste from, 230–231.

First Steps, in adaptive activity, 38–40.

Food-Securing Impulse, 5–8.

Formal Education, rôle of, in developing restraint, 161–163.

Formal Studies, can be taught dynamically, 194–195.

"Fox and Geese," 181.

Free Ideas, ability of individual to develop, 71–72.

Friction, avoiding needless, 249–250.

Fusion, of restraining forces, 160.

Games, competitive, 180–181.

Gangs, formed by boys, 171; promote pugnacity, 174.

Gary Schools, 191.

Generalization, in adaptive activities, 54–67.

Germany, traits of, exhibited during the World War, 177.

Gesture, figurative, 99–101; use of, in conveying ideas, 101–102; to emphasize feeling, 102–103; relation to language, 103; individual differences in use of, 104–105.

Girls, form "sets," 181–182.

Good Ventilation, requirements of, 281–283.

Good Will, wish to secure, 20–21.

Handicaps, to endurance, 263–264.

"Hare and Hounds," 181.

Health, and cleanliness, 278.

Heating System, arranging a, 286–287.

Hereditary Forces, vying with environment, 32–33.

Higher Forms, of adaptive activities. (*See* Adaptive Activities.)

History, influence of ideals established in, 163–164.

"Houses of Childhood," 188.

Human Machine, loss of energy in muscular tensions, 250.

Ideas, free, ability of individual to develop, 71–72; use of gesture in conveying, 101–102.

Imagination, 71–74; ability of individual to develop free ideas, 71–72; ability to foresee consequences and adapt means to ends, 72–73; free concepts controlled by ends to be attained, 73–74.

Imitation, rôle of, in relation to hereditary forces, 33; 46–53; as a form of adaptive activity, 46–47; phenomena of mimicry, 47; when imitation begins, 48–49; apperception in, 49–50; principle illustrated in adult, 50–51; course of development with respect to, 51–53; of self-restraint, 158–159.

Imitativeness, course of development in, 51–53.

Impulse, food-securing, 5–8; self-protective, 8–9; constructive, 24–26; to solve intellectual problems, 26–27. (*See* Motive Forces in Development.)

Individual, the perfectly restrained, 154–155.

Individual Differences, in power of endurance, 264–265. (*See* Inhibition, Self-Restraint.)

Indoor Air, in relation to energy, 280.

Indoor Games, *vs.* boisterous games, for relaxation, 257–258.
Indoor Temperature, in relation to energy, 285–286.
Infancy, development of coördination in, 128–129.
Infant, helplessness of, 35–38.
Inhibition, development of, 140–168; children's lack of, 140–142; effect of motor restraint on mental activity, 142–145; restraint comes with development, 145–148; neurological view of, 148–149; psychological view of, 149–153; phenomena of degeneration, 151–153; restraining forces, 154–168; perfectly restrained individual, 154–155; experiences which develop restraint, 155–156; stages in acquiring restraint, 156–157; physical coercion not the only force leading to restraint, 157–158; operation of restraining influences, 158; imitation of self-restraint, 158–159; restraining influence of heroes in stories, 159–160; fusion of restraint forces, 160–161; weakening of an impulse, 161; rôle of formal education in developing restraint, 161–163; influence of ideals established in history, literature, *et al.*, 163–164; restraining influence of habits established by study, 164–165; individual differences in the matter of self-restraint, 165–168.
Integration, of simple acts into more complex adjustments, 44–45.
Intellectual Well-Being, 18–34. (*See* Motive Forces in Development.)
Intelligence, types of, 57–58; quality of animal, 60–61; illustration of a dog's, 64–67; one trait of distinctly human, 67; distinction between primitive and higher types of, 74–75; in ascendancy, 271–273.
Irish, freedom of expression, 104.
Italians, freedom of expression, 92.

James-Lange Theory, 86.
Job, eagerness to find, 184.

"King Pharaoh," "educated" horse, 54–61.
Knowledge, urge to gain, 23–34.
Krall, Herr Karl, trainer of "Muhamed," and "Zarif," 54.

Language, relation of gesture to, 103; acquired more easily and naturally than drawing, 125–126.
Lathrop Industrial School, 336–337.
Leadership, submission to, as a motive force, 23.
Learning, involves excessive activity, 42–44.
Lens, maladjustment of, 242–243.
Literature, influence of ideals established in, 163–164.
Love of Country, first step in developing, 202.

Manual Dexterity, first stages in acquiring, 129–130.
Men, less expressive than women, 91–92.
Mental Activity, effect of motor restraint on, 142–145.
Mental Tension, begets muscular tension, 250–252.
Mimicry, phenomena of, 47.
Montessori Apparatus, 189.
Montessori Schools, principle of dynamic education illustrated in, 188–190.
Motive Forces in Development, 3–34; physical well-being, 3–17; illustration of nature and rôle of driving forces, 3–5; food-securing impulse, 5–8; self-protective impulse, 8–9; conflict of forces, 9–10; resistance to remedial treatment, 10–12; self-protection against wind and weather, 12–13; interest in clothing for decoration rather than for protection, 13; fear as a protective agent, 14–15; fear as a motive force, 15–17; social, intellectual and æsthetic well-being, 18–34; passion for experiences with persons, 18–19; passion to communicate, 19–20; wish to secure the good will of one's fellows, 20–21; rivalry as a motive force, 21; resentment and aggression, 22–23; submission to leadership as a motive force, 23; knowledge for its own sake, 23–24; constructive impulse as a motive force, 24–26; impulse to solve intellectual problems, 26–27; choice of the beautiful and avoidance of the ugly, 27–28; activities reminiscent of ancestral life, 28–31; environment vying with hereditary forces, 32–33; rôle of imitation, 33; two forces acting on the child in his development, 34.
Motor Restraint, effect of, on mental activity, 142–145.
"Muffin," "educated" dog, 64–67.
"Muhamed," "educated" horse, 54.
Muscular Contests, 174–175.
Muscular Tension, 250; mental tension begets, 250–252.

Nervous Energy, wasting in home, 222–223.
Neurological View, of inhibition, 148–149.
Noise, as a nervous irritant, 224–227.
Northmen, freedom of expression, 92.

"Off days," 266–269.
Olfactory Cues, animals' responses depend upon, 60.
Organs, law of economy in developing and maintaining, 269–271; when not used tend to degenerate, 271.
Over-Eating, and under-cleaning, 276–278.
Overstrain, in education, 218–287; wasteful practices, 218–262; present-day conditions cause of, 218–220; chief cause of, 220–221; need for periods of quiet, 221–222; wasting nervous energy in the home, 222–223; the teased child, 223–224; noise as a nervous irritant, 224–227; in the schools, 227–230; waste from excessively fine work, 230–231; unnecessary tension in writing, 231–233; typewriter less wasteful than the pen, 233–235; postures that lead to waste of energy, 235–240; eye in relation to nervous waste, 240–242; maladjustment of lens, 242–243; the effects of eye-strain, 243–246; importance of the teeth in relation to conservation of energy, 247–249; avoiding needless friction, 249–250; loss in the human machine from muscular tensions, 250; mental tension begets muscular tension, 250–252; James on "unclamping," 252–253; reflex effect of bodily attitudes, 254–256; play as a restorative, 256–257; quiet indoor games *vs.* boisterous games for relaxation, 257–258; requirements of relaxation, 259–262; conditions affecting endurance, 263–287; handicaps to endurance, 263–264; why people differ in power of endurance, 264–265; training for mental endurance, 265–266; training can be overdone, 266; "off days," 266–269; new times bring new problems, 269; law of economy in developing and maintaining organs, 269–271; organs that are not used tend to degenerate, 271; intelligence is in the ascendancy, 271–273; price of "refined" training, 273–274; hardening the body, 274–275; new social conditions, 275–276; over-eating and under-cleaning, 276–278; health and cleanliness, 278; "Blue Monday," 278–280; energy in relation to indoor air, 280; what are the requirements for good ventilation, 281–283; toxic effect of "dead" air, 283–284; rôle played by clothing in maintaining vigor, 284–285; energy in relation to indoor temperature, 285–286; arranging a heating system, 286–287.

Passion, for experiences with persons, 18–19; to communicate, 19–20.
Patriotism, developing, 200–202.
Pedal Control, development of, 134–135.
Pen, more wasteful than typewriter, 233–235.
Personal Defects, may be increased by suggestion, 211–213.
Persons, passion for experiences with, 18–19.
Physical Well-Being, 3–17; illustration of nature and rôle of driving forces, 3–5; food-securing impulse, 5–8; self-protective impulse, 8–9; conflict of forces, 9–10; resistance to remedial treatment, 10–12; self-protection against wind and weather, 12–13; interest in clothing for decoration rather than for protection, 13; fear as a protective agent, 14–15; fear as a motive force, 15–17.
"Plagüing People," 178.
Play, as a restorative, 256–257.
Postures, that lead to waste of energy, 235–240.
Primitive Forms, of adaptive activities. (*See* Adaptive Activities.)
Profanity, 178–179.
Property, destruction of, 177–178.
Protective Agent, fear as a, 14–15.
Psychological View, of inhibition, 149–153; phenomena of degeneration, 151–153.
Psychology, of drawing, 127.
Puberty, transformations occur abruptly during, 169–171.
Pugnacity, promoted by gang, 174.

Quiet, need for periods of, 221–222.

Racial Differences, in expression, 92–93.
Reason, 74–76; most important distinction between primitive and higher types of intelligence, 74–75; analysis and synthesis, 75–76.
"Refined training," price of, 273–274.
Relaxation, boisterous *vs.* indoor games for, 257–258; requirements of, 259–262.
Remedial Treatment, resistance to, 10–12.
Representation, difficulty of, 112–113.
Resentment, 22–23.

Resistance to Remedial Treatment, 10–12.
Restraining Forces, fusion of, 160.
Restraining Influences, operation of, 158.
Restraint, comes with development, 145–148; experiences which develop, 155–156; stages in acquiring, 156–157; physical coercion not the only force leading to, 157–158.
Rhetoric, teaching of, in a dynamic way, 196–197.
Rivalry, as a motive force, 21.

Schools, overstrain in, 227–230.
Science, teaching of, in high school, 197–198.
Secondary Education, dynamic methods in, 195–196.
Self-Protection, against wind and weather, 12–13.
Self-Protective Impulse, 8–9.
Self-Restraint, imitation of, 158–159; individual differences in the matter of, 165–168.
Sensori-Motor Response, 58–59.
Sentences, child's use of, 136–137.
"Sets," formed by girls, 181–182.
Sex-Interest, activities growing out of, 182–184.
Sickroom, use of suggestion in, 209–211.
Sign Language, development of, 106–107.
Social Well-Being, 18–34. (*See* Motive Forces in Development.)
Spaniards, freedom of expression, 92.
Special Relations, difficulty of representing in drawing, 125.
Speech, development of coördination in, 135–136.
Stealing, 175–176.
"Steeple Chase," 181.
Study, restraining influence of habits established by, 164–165.
Submission, to leadership as a motive force, 23.
Suggestion, rôle of, in dynamic education, 205–217; action follows the direction of attention, 205–206; constructive treatment of aches and ills, 206–207; one can intensify children's misfortunes by suggestion, 207–209; use of, in sickroom, 209–211; one's defects may be increased by suggestion, 211–213; morals of a community may be elevated or degraded by suggestion, 214–216; in the theater, 216–217.
Swimming, 180.
Symbolization, in adaptive activities, 67–71; one trait of distinctly human intelligence, 67; importance of, in adaptive activity, 67–70; development of symbolizing activities in child, 70–71.
Symbols, development of linguistic, 107–110.
Synthesis, in adaptive activity, 75–76.

Teased Child, the, 223–224.
Teeth, importance of, in relation to conservation of energy, 247–249.
Theater, suggestion in, 216–217.
Thought, expression of, 93–96.
Tobacco, 178–179.
Toxic Effect, of "dead" air, 283–284.
Training, can be overdone, 266.
Trial-and-Success, 33–46; helplessness of the infant, 35–38; first steps in learning, 38–40; concrete example of acquiring a voluntary act, 40–41; learning involves excessive activity, 42–44; integration of simple acts into more complex adjustments, 44–45; nothing is learned *de novo*, 45–46.
Truancy, 179–180.
Typewriter, less wasteful than pen, 233–235.

Ugliness, avoidance of, 27–28.
Under-Cleaning, and over-eating, 276–278.

Vigor, rôle played by clothing in maintaining, 284–285.
Visual Cues, animals' responses depend upon, 60.
Voluntary Act, concrete example of acquiring, 40–41.
Von Ostend, Herr, trainer of "Clever Hans," 55.

Wasteful Practices, 218–262; present-day conditions that cause overstrain, 218–220; chief cause of overstrain, 220–221; need for periods of quiet, 221–222; wasting nervous energy in the home, 222–223; the teased child, 223–224; noise as a nervous irritant, 224–227; overstrain in the schools, 227–230; excessively fine work; 230–231; unnecessary tension in writing, 231–233; typewriter less wasteful than the pen, 233–235; postures that lead to waste of energy, 235–240; eye in relation to nervous waste, 240–242; maladjustment of the lens, 242–243; effects of eye-strain, 243–246; importance

of the teeth in relation to conservation of energy, 247–249; avoiding needless friction, 249–250; loss in the human machine from muscular tensions, 250; mental tension begets muscular tension, 250–252; James, on "unclamping," 252–253; reflex effect of bodily attitude, 254–256; play as a restorative, 256–257; quiet indoor games *vs.* boisterous games, 257–258; requirements of relaxation, 259–262; all experience affects one for good or ill, 262.

Well-Being, physical, 3–17; social, intellectual and æsthetic, 18–34. (*See* Motive Forces in Development.)

Wind and Weather, self-protection against, 12–13.

Winnebago County, teaching of arithmetic in, 193.

Women, more expressive than men, 91–92.

Writing, unnecessary tensions in, 231–233.

"Zarif," "educated" horse, 54.

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